

THE EFFECTIVENESS OF A COMPUTER PROGRAM ON CAREER PLANNING
FOR UNIVERSITY STUDENTS

Janet E. Pollock, B.A.

Department of Graduate and Undergraduate
Studies in Education

Submitted in partial fulfillment of
the requirements for the degree of

Master of Education

Faculty of Education

Brock University

St. Catharines, Ontario

1992

© Janet E. Pollock 1992

ABSTRACT

This study investigated the effectiveness of a computer program, PERSONAL CAREER DIRECTIONS (PC DIRECTIONS) (Anderson, Welborn, & Wright, 1983) on career planning and exploration for twenty-four Brock University students (18 women and 6 men) who requested career planning assistance at the Career/Placement Services of the Counselling Centre. A one-group pretest/posttest design was used in the study. Progress in career planning and exploration was measured by Career Planning (CP) and Career Exploration (CE) scales of the Career Development Inventory (College and University Form) (Super, Thompson, Lindeman, Jordaan, & Myers, 1981). A paired samples 2-tailed t test for Career Development Attitudes (CDA), the combined CP and CE scales, revealed the posttest scores were significantly higher than the pretest scores, $t(23) = 3.74$, $p < .001$. Student progress was also assessed by self-report lists of job titles which reflected positive changes after students used PC DIRECTIONS. In response to several questions, students' attitudes were more positive than negative toward the program. Implications are that PC DIRECTIONS is an effective component in promoting career planning for university students. Further studies may reveal that different types of students may benefit from different interventions in the career planning process.

ACKNOWLEDGEMENTS

I would like to thank the Faculty of Education at Brock University for providing a stimulating learning environment throughout my graduate studies and the Counselling Centre at Brock for creating a positive environment conducive to personal growth and development.

Special thanks and appreciation are extended to the following for their help in completing this thesis:

Dr. Patricia Cranton, my thesis advisor, guided me throughout my research with patience and encouragement. Patricia's inspiring classes and positive feedback promoted confidence in my endeavours.

Cathie Closs, Co-Director of the Counselling Centre, served as a member of my thesis committee. Not only has Cathie offered support to my research, but she provided expertise within the field of career planning and development.

Dr. Kris Kirkwood served on my thesis committee and provided assistance in recording data.

Cindy Nogradi, Coordinator of Career/Placement Services in the Counselling Centre, offered constant support and assistance and acted as a judge for student responses to questions.

The students who participated in the study were most cooperative with their time and effort in completing their

tasks.

Finally, my family continuously offers me support and understanding as I pursue my academic goals. My sincere gratitude to all of them for their tolerance and encouragement.

TABLE OF CONTENTS

	<u>Page</u>
Abstract.....	ii
Acknowledgements.....	iii
List of Tables.....	vii
 CHAPTER 1: THE PROBLEM.....	 1
Introducation.....	1
Statement of the Problem.....	2
Purpose of the Study.....	3
Rationale for the Study.....	4
Definition of Terms.....	6
Assumptions and Limitations.....	9
Overview of the Remainder of the Document.....	10
 CHAPTER II: REVIEW OF RELATED LITERATURE.....	 11
Theoretical Approaches to Career Development...	11
Theories of Occupational Choice.....	12
Parsons' Trait and Factory Theory....	12
Roe's Theory of Personality Development And Occupational Choice.....	 13
Holland's Theory of Personality and Model Environments.....	15
Psychodynamic Theory.....	16
Theories of Career Development.....	17
Developmental Theory of Occupational Choice.....	18
Super's Theory of Vocational Development.....	19
Theories of Career Decision Making.....	21
Convergence of Modern Theories.....	26
Tools and Techniques to Assess Career Development.....	 31
Exploration in Career Planning.....	33
Computer-Assisted Interventions.....	37
Advantages of Computer Interventions.....	41
Concerns of Computer Interventions.....	42
Summary.....	43
 CHAPTER III: METHODOLOGY.....	 45
Context of the Study.....	45
Sample Selection.....	46
Research Design.....	47
Treatment Method.....	48
Instruments.....	50
Procedure.....	53
Limitations of the Study.....	54
Data Collection and Recording.....	55
Data Analysis.....	55

CHAPTER IV: RESULTS.....	58
CHAPTER V: DISCUSSION.....	71
Discussion of Hypothesis.....	71
Discussion of Questions.....	71
Implications for Further Research.....	79
Implications for Practice.....	81
Conclusions.....	82
References.....	84
Appendix A: Career Planning Research Study/ Consent Form.....	100
Appendix B: User Information Outline.....	102
Appendix C: PERSONAL CAREER DIRECTIONS Printout..	104
Appendix D: Background Information/Job Titles....	108
Appendix E: Follow-up Questions for PC DIRECTIONS.....	109

List of Tables

	<u>Page</u>
Table 1: Descriptive Statistics for Scores on Career Development Inventory (N = 24)	59
Table 2: Correlations Among Career Planning (CP) and Career Exploration (CE) for Pretest (PRE) and Posttest (POST) (N = 24)	60
Table 3: Descriptive Statistics by Demographics for Career Development Attitudes (CDA)	61
Table 4: Paired Samples Two-tailed T-test for Career Development Attitudes (CDA)	65
Table 5: Distribution of Responses to Follow-up Questions For PERSONAL CAREER DIRECTIONS (N = 24)	68

CHAPTER I: THE PROBLEM

Introduction

Career planning services are offered to students at most universities and colleges by counselling and placement centres. Typically, these services may include career resource libraries, professional career counsellors, career assistants who are often trained senior students, workshops, seminars, career development courses and a variety of techniques to aid students in career planning and career decision making. Computerized career guidance programs are among the tools and techniques that are gaining in popularity as an effective component to existing career planning services (Fukuyama, Probert, Neimeyer, Nevill, & Metzler, 1988; Johnston, Buescher, & Heppner, 1988; Sampson, Shahnasarian, & Reardon, 1987).

Several studies have assessed the impact of particular computer programs on career self-efficacy and decision making among college and university students (Fukuyama et al., 1988; Garis & Hess, 1989; Pinder & Fitzgerald, 1984). The studies indicate that computerized guidance systems are viable interventions that can assist university students in career planning.

Almost a decade ago, Holland (1983) stated that most students want at least two kinds of help with career planning: they want to be sure their occupational choice is right for them; and they want to be sure that they have not

overlooked a more desirable occupation. Changes in the economy and in technology have added a new direction to the type of assistance that students want. They want to be sure they are acquiring those marketable skills and attributes that will ensure a position in their area of interest upon graduation. Holland (1983) further added that although no test can provide perfect assurance, unwanted outcomes and risks can be reduced with some ideas and tools.

Research has shown that interventions in career planning generally have positive effects (Baker & Popowicz, 1983; Spokane & Oliver, 1983) but that some given treatments are more effective with some students than others (Oliver & Spokane, 1988). Oliver and Spokane (1988) recommend that research be conducted with those actual students who seek career guidance in a college or university career centre, and that diagnostic assessment prior to any treatment may determine which method will be most effective. Garis and Niles (1990) suggest the need for further research concerning the effectiveness of popular computer systems in specific settings, in use with other career interventions, and with various student populations.

Statement of the Problem

The Career/Placement Services in the Counselling Centre at Brock University have recently acquired a computerized career guidance program, PERSONAL CAREER DIRECTIONS (PC

DIRECTIONS) (Anderson, Welborn, & Wright, 1983) which to date, has only been used on a limited basis.

This study is a quasi-experimental, one-group pretest/posttest design (Best & Kahn, 1989) to assess the effectiveness of PC DIRECTIONS in promoting career planning and career exploration of university students. Students who expressed an interest in career planning assistance during a fall semester were assessed from a pretest to posttest sequence. All students were exposed to career planning treatment, the computer program, PC DIRECTIONS. The effectiveness of PC DIRECTIONS in promoting career planning and career exploration of university students was measured by the Career Development Inventory (College and University Form) (Super, Thompson, Lindeman, Jordaan, & Myers, 1981) and a self-report list of job titles. In addition, students were asked to respond to a few informal questions upon completion of the program.

Purpose of the Study

The purpose of this study is to assess the effectiveness of PC DIRECTIONS in promoting career planning attitudes of university students. It was hypothesized that there would be a positive effect in career planning and career exploration as measured by the Career Development Inventory and a self-report list of job titles for students utilizing PC DIRECTIONS. Student attitudes and feelings

were assessed by their responses to questions asked upon completion of the computer program.

Several questions were addressed during the course of the investigation:

1. Can the computer program effectively assist students in the career planning process?
2. Will the utilization of a computer program influence attitudes by providing information that helps individuals with effective career planning?
3. Are there implications that a computer program will have different effects for different types of students in exploring career options?
4. Are there implications that the computer program might have an effect on the way in which students explore career options?

Rationale for the Study

Modern approaches to career choice and development incorporate an organized and systematic process for career planning (Atkinson & Murrell, 1988; Gysbers & Moore, 1971; Harren, 1979; Holland, 1985; Krumboltz, 1979; Super, 1980; Tiedeman & O'Hara, 1963). The steps in the career planning process include an awareness of a decision to be made; exploration of one's self; exploration of the world of work; choosing alternatives and making decisions based on the knowledge gained about one's self and occupations; and

commitment to a plan for developing strategies in order to implement one's choices. Computerized career guidance programs have proven beneficial in facilitating the process for university students (Cairo, 1983; Pinder & Fitzgerald, 1984; Rayman, Bryson & Bowlsbey, 1978; Sampson & Stripling, 1979).

Computerized career guidance programs may be helpful in a short period of time at each stage of the career planning process. The programs help students to explore themselves by assessing attributes such as interests, aptitudes and temperaments. The programs help students to explore the world of work by gathering occupational and educational information, and generating lists of job titles. Programs have also been designed to help in the decision-making process.

Students using computerized career guidance programs find them helpful, interesting and enjoyable to use (Cairo, 1983; Miller & Springer, 1986). However, users of these programs may be at different stages of the career planning process and their needs may differ (Cairo, 1983; Slaney, 1988). This implies that different students may benefit in different ways from their interactions with the program.

In a meta-analysis of outcomes of vocational interventions, including computer-assisted interventions, Spokane and Oliver (1983) found that most career interventions have beneficial effects. However, they

suggest that the findings of some studies are inconclusive and that more research is needed to guide the use of computer-assisted interventions and to evaluate their effects. This study will investigate the effectiveness of one particular computer program, PC DIRECTIONS, in promoting career planning of university students.

Definition of Terms

In recent years the term career has often replaced vocation although both are still used interchangeably.

Shertzer (1977) offers several relevant definitions as they relate to this study:

Career is generally defined as the sequence of occupations, jobs, and positions held during the course of a person's lifetime. Shertzer also adds that career is a "time-extended working out of a purposeful life pattern through work undertaken by the individual" (Shertzer, 1977, p. 173).

Job generally refers to the particular position a person holds or the particular kind of work done for pay in that position.

Occupation is the kind of activity needed to perform work tasks. The tasks involved are similar from one situation to another.

Position is a set of tasks performed by a person within a particular organization.

Vocation is similar to occupation but broader in scope. It is used to convey a sense of life mission or purpose.

Shertzer (1977) generally defines work as activity that is required and for which payment is made. Specifically, work is the activity by which human beings exercise control over their lives. It is a shared experience.

Pietrofesa and Splete (1975) present appropriate definitions as they relate to career planning:

Career Development is defined as an ongoing process that occurs over the life span and includes home, school, and community experiences related to an individual's self-concept and its implementation in life style as one lives life and makes a living.

Career Education is part of the process of career development that occurs both within and outside of a school setting.

Career Guidance is a part of career education in which a helping person aids another person in understanding himself or herself and the environment, including work opportunities, and in determining life style.

Components in the conceptualization of career planning are identified in the four general clusters of career education outlined by Oppenheimer & Flum (1986):

Self-Knowledge - The individual develops an awareness of one's unique pattern of talents, interests, values, and

preferred styles to develop a flexible self-concept and promote decision making.

Knowledge of the World of Work - The individual develops skills in acquiring knowledge about the world of work, including the conventional aspects of occupational life, the conflicts in various occupations, and the life styles associated with different occupations.

Decision Making - The individual may be faced with increasingly complex choices in deciding on a career. Decision-making ability can be improved through explaining the steps involved in the career planning process, exposing students to opportunities for making choices, and monitoring the process of choice.

Planning Skills - The fourth component in career planning which contains elements of the three previous components and provides a link among them, is the acquisition of planning skills. Effective planning is based on appropriate self-knowledge, awareness of the realities of the external world, and the ability to make sensible choices.

Finally, Career Exploration involves those activities, mental or physical, in which individuals seek information about self and environment that may facilitate the process of making decisions about occupational choice (Jordaan, 1963; Savickas, 1989; Stumpf, Colarelli, & Hartman, 1983).

Assumptions and Limitations

The concept of career planning for university students may be influenced by many aspects and variables. Since it is not possible to be all-inclusive, several limitations are noted.

Other services and programs offered by the Counselling Centre to assist students with career planning were not incorporated into this study. These interventions include a self-administering assessment compiled by the Counselling Centre that assesses one's interests, skills, values and preferred working conditions; Careers Day, an information day for students; workshops for career planning, writing resumes and cover letters, developing job search strategies and interview skills; and individual assistance.

In addition, only those students who approached the Career Services for career planning assistance on the computer program participated in this study, and they may not comprise a representative sample of the population of Brock University students. Controls were placed on such variables as gender, age and number of courses completed. However, career planning may also be influenced by such variables as motivation, maturity, personality, cognitive and socioeconomic circumstances.

Overview of the Remainder of the Document

The remainder of the study is reported on in the following chapters. Chapter II reviews the literature of career development as it relates to career planning and exploration, and the use of computer programs in the process. Chapter III describes the method including the sample selection, research design, treatment method, instruments, procedure, and data collection, recording, and analysis. Chapter IV presents the results of the analysis. Chapter V includes the discussion, implications and conclusions of the study.

CHAPTER II: REVIEW OF RELATED LITERATURE

Marcel Danis, the Minister of State for Youth (Hot-100, 1990), states in his introduction to a guide to programs and services for youth supported by the federal government, "Choosing a field of study and a career are among the most important decisions a young person ever has to make" (p. 5). Deciding on a career involves complex, difficult choices and informed decision making is important for all students. In order to help make these decisions, career planning services are offered to students at most universities and colleges. In addition, many tools and techniques have been developed and used consistently by career counsellors and educators.

Theoretical Approaches to Career Development

The basis of the tools and techniques and other practical applications of career planning services, including computer guidance programs, are the abundance of theories that have emerged on career choice and development. This chapter will present several of the major theories beginning with the early approaches of vocational development and the emergence of current theories that are specifically relevant to career planning and career exploration. The theories of career choice and development will be discussed as classified by Brown and Brooks (1984): Theories of occupational choice, theories of career development, and theories of career decision making; and the

convergence of major theories as noted by Osipow (1990). A brief overview of the theory will be presented, including several concepts and propositions, and the strengths and weaknesses of the theory primarily in relation to exploration in the career development process.

Theories of Occupational Choice

The matching of individuals and jobs was viewed as a one-time event by the majority of vocational counsellors until the late 1940s (Pietrofesa & Splete, 1975). Theories of occupational choice, such as Parsons' (1909) trait and factor theory, were the basis of vocational guidance. The main focus of these theories is on the process of choosing an occupation, the factors influencing the choice, and the suitability of the choice as determined by need satisfaction, success, or personal adaptation. However, the major weakness of these theories is the lack of attention paid to occupational choice and work in the total life span of the individual (Zaccaria, 1970).

Parsons' Trait and Factor Theory

Theories of vocational development have evolved since the early part of this century when Frank Parsons (1909) formulated a process of matching traits of individuals with those required by available occupations. The process for helping clients included understanding their abilities and interests through interviews, questionnaires and tests;

locating appropriate outlets for these attributes in the world of work; and establishing occupational patterns for a variety of occupations. Three components are incorporated into Parsons' model: self-understanding, knowledge of occupations, and reasoning based on the first two components. Parsons formulated the trait-and-factor approach to occupational choice (Pietrofesa & Splete, 1975) and Parsons' Trait Theory became the cornerstone of vocational guidance (Super, 1957).

Roe's Theory of Personality Development and Occupational Choice

Anne Roe (1956) was one of the first theorists to include the role that personality plays in vocational behaviour (Osipow, 1968). Her theory specifies genetic factors and factors in the environment, such as childhood experiences, that influence the development of needs and personality traits. These factors combine to influence the selection of a vocation, as part of their effect on the total life span pattern. However, her theory fails to address the interaction that occurs between genetic and environmental influences (Osipow, 1968) and the role of aptitudes in career development (Hackett, Lent, & Greenhaus, 1991).

Roe's theory addresses the issue of motivation through focusing on Maslow's (1954) hierarchy of suggested need levels: (a) physiological needs, i.e., hunger and thirst;

(b) safety needs; (c) love, affection and needs of belonging; (d) esteem needs; and (e) self-actualization needs or the need to become fully functioning and achieve one's potential. The significance of the occupation to the fulfillment of these basic needs is stated by Roe (Roe & Lunneborg, 1984): "In our society, there is no single situation that is potentially so capable of giving some satisfaction at all levels of basic needs as the occupation" (p. 32).

Roe (1956) also constructed a classification system of occupations which has been the basis of many assessments and procedures that are used to promote career development through self-awareness and occupational exploration. Her classification system consists of eight occupational groups: service, business, organization, technology, outdoor, science, general culture, and arts and entertainment. There are six levels in each group based on degree of responsibility, capacity and skill. Roe (Roe & Lunneborg, 1984) notes that her classification of occupations seems satisfactory for men but it is not adequate for women since there is no place for homemaker-mother role, no system for accounting for part-time activities outside the home or assistance to one's spouse from the home, and no measure for change from home to work.

In a limited review of studies on vocational choices of college students, Roe (1956) emphasizes the point that it is

not enough to supply vocational information. Factual vocational information can be easily obtained if preceded by self-understanding and self-acceptance.

Holland's Theory of Personality and Model Environments

The shift in vocational development and vocational guidance to an increased emphasis on the individual, with his or her opportunity to be equally as aware of himself or herself as of occupational possibilities (Pietrofesa & Splete, 1975), is evident in Holland's Theory of Personality and Model Environments. John Holland's theory (1959, 1966) of vocational choice is implicitly developmental but also emphasizes the determinants of occupational choice. Holland categorizes people into six personality types: realistic, investigative, artistic, social, enterprising and conventional, and classifies occupations according to these same types. The individual's self-knowledge and occupational knowledge are of critical importance in the process of occupational choice. Through an understanding of the range, levels, and adequacy of potential occupational choices, self knowledge and occupational knowledge contribute to career planning efficacy for university students.

Research studies indicate that Holland's theory of exploration of self and environment facilitates career decision making. However, Holland's theory has been tested to predict preferences and choices rather than sequences of

occupational positions (Super, 1980). In addition, Holland's (1973) revised theory has been criticized (Hackett & al., 1991) for not adequately considering the development of types or the process of career development over the life span (Osipow, 1983). There is also controversy that his popular inventory, the Self-Directed Search (Holland, 1979) still contains sex biases. Nonetheless, Holland's theory has been researched extensively and is respected for its application to everyone without regard to sex, age or race (Weinrach, 1984).

Psychodynamic Theory

Bordin, Nachmann, and Segal (1963) propose a framework for vocational development which is comparable to the theories of Roe and Holland in linking occupational roles to personality dimensions. Similarities of these three approaches also include an emphasis on vocational choice and the prediction of an individual's choice of occupation at a specific time. Both Roe and Holland classify occupations according to personal characteristics or activities. Bordin and his associates expand on the personality characteristics which they feel are incomplete in both Roe's and Holland's theories. They formed a matrix by mapping occupations according to the needs that are gratified and the personality characteristics of members of various occupations.

Bordin (1984) views career choice as a developmental

process motivated by an individual's internal needs and personality. These personal aspects of career development and career choice develop throughout the early years of the individual. Bordin proposes that individuals gravitate toward occupations to satisfy intrinsic needs and motives and build a personal identity. This personal identity is comprised of characteristics unique to the individual and assimilates elements from father and mother. Individuals achieve self-realization through work. Increased awareness and understanding of self assist in career decision making.

Bordin's (1984) approach is beneficial for trained counsellors who help students through individual counselling, and for students who are receptive to an indepth exploration of themselves and their life experiences which may have affected their vocational development. His approach would not appeal to students who are test-oriented and prefer to assess their interests, skills, values or preferred working conditions through a mechanical process of assessment.

Theories of Career Development

Theories of career development view vocational behaviour as a continuing process of growth and learning that occurs throughout different developmental life stages. Major determinants of the career choice process in these theories include individual self-concepts, developmental

experiences, personal history, and the psychosocial environment of the individual (Herr & Cramer, 1984)

Developmental Theory of Occupational Choice

Ginzberg, Ginsburg, Axelrad, and Herma (1951) were among the first to propose that occupational choice was a process, not a one-time event. In their original theory, they concluded that vocational choice is an irreversible process that occurs primarily during the adolescent period and is closely linked with the physical changes that occur during adolescence. They view the vocational choice process as a specific behaviour based on a systematic and predictable series of tasks that young people face during adolescence. These tasks culminate in a specific vocational choice which is related to the accomplishments of the various tasks encountered. In their theory, the role of emotional factors is emphasized in career development. A satisfactory occupational choice is made by persons who seek appropriate expression for emotional needs.

Osipow (1968) outlines several drawbacks of the research studies of Ginzberg et al. (1951). In addition to limitations of their sampling and measures, the concept of irreversibility and inflexibility of the career development process is stated too strongly. Subsequent events can change the direction of the vocational process. Many college students change majors and many people change careers in maturity. By the 1970s, Ginzberg (1972) revised

the theory to occupational choice as a lifelong process of decision making.

Osipow (1968) cites elaborate studies (e.g., O'Hara & Tiedeman, 1959) that explored the implications of the developmental approach of Ginzberg and concluded that the development of a vocational self-concept is related to the increasing congruence of tested attributes and relevant self-estimates, and that this development occurs at various stages. However, Osipow also cites studies that are inconclusive with regard to specifically what the stages are, when they occur, and the order in which they occur.

Super's Theory of Vocational Development

By the 1950s, occupational choice was viewed as a developmental process that developed over the life span of the individual (Gysbers, 1984). Donald Super (1957) placed the study of vocational behaviour in the context of human development and promoted the term "vocational development" (p. 185). Vocational development is perceived as one aspect of the individual's total development. According to Super, vocational development is a continuum, and vocational maturity a point on this continuum indicating the degree of maturity that an individual has reached. Vocational choice is not a one-time event of choosing an occupation, but rather a process that denotes a series of choices. By eliminating or retaining alternatives, the narrowing down process results in occupational choice.

In his Theories of Career Development, Osipow (1968) reviews the research conducted by Super (1957) and his associates (e.g. Super, Starishevsky, Matlin, & Jordaan, 1963) to develop Super's theory. Super's early research on the development of a self-concept and its relationship to vocational maturity seems to be based mainly on studies involving school boys, although later studies did include women as well as men.

As an approach to vocational guidance, Super (1957) developed a Life Pattern Theory suggested by the work of sociologists, psychologists and economists. Super analyzed occupational histories of individuals by studying social status, intelligence and industrial change, or the course of human life. He analyzed sequence of events and the development of characteristics in order to determine the recurring themes and underlying trends. The underlying assumption in this approach is that one way to understand what an individual will do in the future is to understand what the individual did in the past.

Super's (1963) theory of vocational development includes elements of a self-concept theory. Individuals express their ideas of the kind of person they are in expressing a vocational preference and seek to implement a concept of themselves in entering an occupation. Individuals achieve self-actualization (or fulfillment) in getting established in an occupation which permits the

playing of a role appropriate to the self-concept. The behaviours that a person engages in to implement the self-concept vocationally depend on the individual's stage of life development. In adolescence, individuals recognize the differences between self and others and make decisions about education and work that are consistent with self-concepts. As one matures, the self-concept becomes stable (Osipow, 1968). Maturation and career development are closely related. As a person matures, progress occurs through a series of developmental career life stages with opportunities at each stage to successfully encounter specific tasks.

Vocational development is viewed as one aspect of the many facets in the development of the individual. Basically, the individual does not choose an occupation at a specific point in time, but rather makes a series of occupational-related choices at various life stages which result in vocational development rather than an occupational choice per se (Zaccaria, 1970). The chief drawback of developmental theories is that they place too much emphasis on the individual's internal conditioning toward a career without adequately considering the influences of the external environment (Dunphy, Austin, & McEneaney, 1981).

Theories of Career Decision Making

From the developmental perspective, vocational

behaviour advances through stages, performing tasks and behaviours which ultimately result in progress of vocational development. Theories of career decision making reflect the emerging view (Phillips & Pazienza, 1988) of examining the tasks and behaviours more closely to determine individual differences in career decision making and how vocational decisions are made.

Theories that emphasize the process of career decision making have precipitated the formation of models which incorporate career decision making with other concepts. Krumboltz's (1979) social learning theory distinguishes conditions that affect career decisions, specifically learning experiences. In addition to the developmental concepts that Tiedeman and O'Hara (1963), Harren (1979), and Super (1980) incorporate into the process of career decision making, Perry (1970) and Knefelkamp and Slepitz (1976) incorporate cognitive development into the career choice process.

The basic concepts of Krumboltz's (1979) social learning approach to career decision making are the learning experiences which influence the process of making a career choice. This approach proposes that individual personalities, behaviour patterns, and cognitive skills result from learning experiences which are reinforced by economic and sociological factors. Career decisions are influenced by the interaction of genetic endowments and

abilities, environmental conditions and events, learning experiences, and cognitive, emotional, and performance responses and skills. The development of task approach skills relevant to career decision making, specifically the skill of information seeking, can be encouraged through positive reinforcement for these skills (Mitchell & Krumboltz, 1984).

Tiedeman and O'Hara (1963) view career development as including elements of the biological constitution of a person, the psychosocial process of forming an ego-identity, and the society or subculture which functions as a source of identification for the person. They feel that in addition to interactions of a person with family, school, and job situation, the psychosocial aspect of career development should also include the sex role. Furthermore, they feel that separate theories of career development are needed for men and women.

To Tiedeman and O'Hara (1963), career development is a process that occurs within a series of decisions that begins with differentiation. The individual anticipates a problem and proceeds to explore, crystallize or stabilize his or her thoughts, choose and clarify in order to make decisions. The individual becomes committed to a solution and begins the process of integration: implementing, adjusting and assimilating in order to come to a solution. This process is repeated many times in the course of one's life as

problems are faced and decisions made.

Harren (1979) feels that career decision-making models need to be distinguished from career development models. Career decision making needs to be understood within the broader spectrum of career development. In addition it should focus on a specific life stage of development and the vocational behaviours within that stage.

Based on the work of Tiedeman and O'Hara (1963), Harren (1979) developed a model of the career decision-making process for college students which involves a series of four steps: awareness, planning, commitment and implementation. In Harren's model, career decision making is an ongoing process in which a person organizes information, examines various alternatives, and then expresses commitment to a course of action. Progress in trying to reach a decision is influenced by the characteristics of the person trying to reach a decision (internal conditions) as well as environmental conditions (external conditions).

Knefelkamp and Slepitz (1976), adapted Perry's (1970) scheme and the level of cognitive processing to the development of an individual's thinking about career decision making. The basis of their cognitive-developmental model of career development are Perry's stages that describe the development of a student's reasoning about knowledge through cognitive processes in organizing, integrating and using career information. Students progress from the need

to find the right job to making a career commitment moving through stages categorized as dualism, relativism, and commitment within relativism.

In the dualistic stage, the student begins with a simplistic, categorical view of career. External factors in the environment control their thinking. At this stage, students depend on perceived authorities, such as parents, teachers, and counsellors, and results of assessments to provide the answer as to the right career. In defining both themselves and the right career decisions, factors such as prestige, power, salary, and the economy play an important role. Anxiety is reduced in the early cognitive stages of career decision making by these external references.

As students enter the relativistic stage, the shift of the focus of their approach to career decision making is to the self. Throughout this stage, students utilize their skills of analysis in exploring career alternatives and begin reflecting on making a commitment, often with the help of others.

At the commitment within relativism stage, students integrate career identity and self-identity. They actively seek out and process information from the environment, take risks to commit to a career decision, and assume responsibility for their decisions.

Knefelkamp and Slepitza (1976) present the complexities of the career decision process and the implications that

students may be helped with different methods depending on their level of cognitive development.

Super (1980) states that fitting a career decision-making model into a life-stage model is difficult. Super's career decision model is a cycle that begins with an awareness of an impending career decision. The individual proceeds by formulating the question, reviewing premises, identifying and seeking facts, evaluating and weighing the data, identifying alternatives and possible outcomes, exploring and weighing alternatives, selecting the preferred plan of action, storing alternatives for future reference, and pursuing the plan on either an exploratory basis or as a tentative commitment. Whether the individual pursues exploration or commitment, he or she continues to collect data, evaluate outcomes and modify plans. Super himself declares that his model does not include the fact that time intervals at any one step may vary.

Convergence of Modern Theories of Career Development

The concern for understanding the career development process beyond that of initial selection and entry into the work force is evident in modern theories of career development that incorporate elements of earlier theories.

Super's (1963) theory is perhaps one of the most progressive and widely accepted of the contemporary theories of vocational development. He systematically integrates

relevant aspects of existing theories through continuous research studies and constant revision. To Super, vocational choice is not seen as choosing an occupation at one point in time, but rather as a continuous process composed of a series of decisions and transitions during the life span of the individual (Oppenheimer & Flum, 1986).

Osipow, Walsh and Tosi (1980) outline the common themes of modern vocational or career development theories. The first conceptual theme in these theories is that career development is an organized and systematic process that proceeds through stages of development and growth. A second common theme is that career development is influenced by the cultural-social-economic environment of the individual. A third major theme is that in western society it is possible for individuals to express themselves through work. This can be accomplished through implementing a self-concept, matching individual attributes and traits with those required of particular occupations, and displaying those behaviours that relate to cognitive styles in order to find congruence between self and occupational environments. Finally, modern theorists agree that decision making and satisfying personal goals often elicit anxiety about career choice.

Hesketh, Elmslie, and Kaldor (1990) describe Gottfredson's (1981) theory as one of the major new vocational theories to emerge in the 1980s. She addresses

issues of narrowing the range of occupational alternatives during early childhood and adolescence through the development of cognitive processes, and describes the importance of factors, i.e., gender, prestige and interests, that influence the implementation of a career. Gottfredson attempts to fill the gap in areas neglected by previous theorists, especially in integrating both content and process of career choice. However, empirical research on her theory and on other new theories that have emerged remains limited (Osipow, 1990).

Osipow (1990) discusses the logical convergence of theories of career choice and development, and the additional concepts, outcomes, and predictions of major approaches. Osipow states that in recent years, Holland has emphasized parental influence, both biological and environmental, on development of type. In Holland's (1973) theory, the process of matching personality type with congruent environments is influenced by the consistency, differentiation, and identity of the type. The appropriateness of the match is indicated by persistence, satisfaction and stability of the choices. Holland's theory and classification system presents a multidimensional view of personality (Alvi, Khan, & Kirkwood, 1990) and has been shown to be valid and reliable (Gianakos & Subich, 1988).

In addition to parental influences, the social learning approach (Osipow, 1990) also include role models of others

that influence behaviours, skills and attitudes in career development through reinforcement patterns. The skills and attitudes (such as self-efficacy) involved in making career choices reflect the skills that one develops through decision making (such as observation and self-evaluation).

The developmental theories of Super and his associates (Super et al., 1963) are also discussed by Osipow (1990). Super (1980) describes the development of the self-concept through the interaction of life stages and personality. In progressing through these stages, the individual masters vocational development tasks and implements a self-concept. The progress determines the individual's vocational maturity and reflects ease of and satisfaction with career choice.

Osipow's (1990) analysis of modern theories of career choice and development discloses the effectiveness of each approach and combines approaches for addressing different issues and populations. Holland's (1985) system of person-environment match allows for a simple, basic choice of an occupational field. It also allows for an assessment of choices at various life stages as identified by Super (1980). Super's approach allows for interventions at specific life stages and the specific skills to be mastered at different stages of vocational maturity. Stage levels can be assessed through the Career Development Inventory (Super et al., 1981). The social learning approach (Krumboltz, 1979) is appropriate for developing decision-

making skills and other strategies for career planning.

A multidimensional theory assimilates features from previous theories, adds some new dimensions, and offers a more comprehensive framework for career planning for the college student (Dunphy, Austin & McEneaney, 1981). In the changing world of work, flexibility is fundamental to career development in the four dimensions of self, environment, time and process.

Self pertains to understanding and assessment of one's personal interests, abilities, needs, values and goals. Environment pertains to becoming familiar with the available career opportunities and requirements. Preparing to make decisions at a specific time is based on focusing on one's attributes and the requirements of occupations. The process consists of a series of career decisions throughout one's life based on the periodic convergence of the first three dimensions.

All theories of career development envision individuals achieving success, satisfaction and happiness through their career choice.

The adolescent is more likely to achieve success and satisfaction in occupational roles if he or she is perceived by self and others as adequately performing preoccupational roles of student and part-time worker. However, the relationship between coping with developmental tasks and success and satisfaction in careers varies with different

life stages, including different stages of the adolescent (Super, 1980).

Tools and Techniques to Assess Career Development

The wide variety of tools and techniques that are available today to help students with their career development and career choice are comprehensive, systematic and theory-based (Gysbers, 1984).

Popular measures (Krieschok, 1987) of interests include the Strong-Campbell Interest Inventory (Campbell, 1974), the Kuder Occupational Interest Survey (Kuder, 1976), and Holland's Self-Directed Search (Holland, 1979).

In an assessment of adolescent career interests and values, Krieschok (1987) expresses a common view that in addition to matching a student's interests and aptitudes with various occupations, assessment of the choice process itself and the person's readiness to engage in the process should be included in career planning services. Osipow (1990) agrees that an integration of self and occupational information should be included in making career decisions, but an assessment of attitudes and skills and the variables that influence their use in career decision making is also necessary.

Vocational maturity behaviours such as exploratory activity, information-seeking activity, and decision-making behaviours and skills are typically assessed by means of

self-report inventories (Harmon & Farmer, 1983), such as the Career Maturity Inventory (Crites, 1973) and the Career Development Inventory (College and University Form) (Super et al., 1981).

Crites (1973) changed the name of his original Vocational Development Inventory to Career Maturity Inventory to reflect an emphasis on career education as a parallel process to career development. To Crites, career does not have the specialized meanings that are associated with vocation but rather implies a meaningful and productive role. The word maturity conveys the progressive changes which emerge from career awareness exploration and decision making. In order to determine maturity, Crites' inventory measures career choice competencies and career choice attitudes.

The Career Development Inventory (College and University Form) (Super et al, 1981), revised from the Career Development Inventory (School Form) (Super, Thompson, Lindeman, Jordaan, & Myers, 1979), yields scores in career planning, career exploration, decision making, world-of-work information, knowledge of preferred occupational group, career development attitudes, knowledge and skills, and career orientation. The career orientation total score "approaches a measure of career or vocational maturity" (Thompson, Lindeman, Super, Jordaan, & Myers 1981, p. 3)".

Measures such as these have been developed to assess

career maturity in adolescents and to identify those students who might benefit from programs and services that help them in their career choices. One of the limitations of these measures noted by Harmon and Farmer (1983) is that most of the measures assess cognitive aspects of readiness and overlook the attitudinal and behavioural dimensions of career maturity. They question whether or not persons with high scores actually engage in exploratory, information seeking and decision-making behaviours and have better decision-making skills.

Krieshok (1987) believes that research on information processing will lead the assessment of career development in different directions. He feels that process variables, such as work role salience and career maturity, will become more significant in assessment, and that more interactive assessments, such as the occupational card sort, guided imagery, and the structured life career assessment interview, will become more popular tools. Such multidimensional assessment tools can facilitate diagnosis of problems related to career indecision (Chartrand & Robbins, 1990).

Exploration in Career Planning

Career development theories (Ginzberg et al., 1951; Gysbers & Moore, 1971; Harren, 1979; Jordaan, 1963; Super, 1957; Tiedeman & O'Hara, 1963;) have stressed the

importance of exploring one's self and the world of occupations in career planning. Satisfactory career choices are made by gathering information through planned and organized career exploration (Atkinson & Murrell, 1988; Crites, 1976; Osipow, 1983). Crites (1969) includes competence in self-appraisal and occupational knowledge in solving career indecision problems.

Arnold and Masterson (1987) confirm that career exploration leads to a more certain self-concept. However, they also suggest that a more certain self-concept may lead to inflexibility in specifying alternate career choices, especially in the early stages of exploration (Phillips & Strohmer, 1983).

Career exploration involves those activities, mental or physical, in which individuals seek to assess themselves and acquire information from the external environment in order to make decisions for choosing and preparing for an occupation. Understanding oneself and the world of work is more likely to be increased if exploration is planned and systematic and cognitively guided by hypothesis testing, and facilitated by others (Jordaan, 1963).

Gelatt (1962) advocated a problem-solving approach to helping students with career exploration based on Dewey's (1938) scientific method of collecting data about themselves and their environment, analyzing its relevancy, studying the possible alternatives, and evaluating the consequences. The

importance of collecting accurate and reliable information in career exploration was emphasized by Gelatt (1962) and is central to models that describe the career decision-making process (Harris-Bowlsbey, 1983). Pietrofesa and Splete (1975) also add that individuals are best prepared to act by understanding the knowledge about oneself and careers, understanding the decision-making process, participating in relevant experiences, and understanding the alternatives and consequences of their choices. Personal involvement in each stage of exploration and understanding is essential with the assistance of others.

Gati and Tikotzki (1989) examined strategies used in the exploration of occupational information by focusing on models of career decision making that call for a search for relevant information. In their investigation of participants who were in the process of making their own career decisions, they studied interactions with MEITAM, a computerized occupational information and guidance system developed in Israel. They found that the sequential elimination strategy used by most of the decision makers is an approach that is conducive to a computer-assisted guidance program. Most career decision makers did not explore all occupational alternatives extensively but rather explored alternatives selectively. They not only narrowed down the options, but in many cases expanded them. Although different strategies were used by people with different

career decision-making styles, it seems that many eliminate options by groups or clusters of occupations in the beginning stages of exploration when the number of options is large. Once the alternatives have been reduced, many decision makers used a compensatory strategy to examine aspects of each occupational alternative by itself and create a short list of occupational alternatives. In this strategy, the advantages of an alternative compensate for the disadvantages that may be involved in it. The final stages of exploration involves a weighting process of the alternatives to identify the one that is deemed to offer the most satisfaction.

Atkinson and Murrell (1988) present a meta-model for career exploration based on Kolb's (1984) Experiential Learning Theory which derives many of the concepts from the approaches previously outlined. Kolb's (1984) model consists of a four-step cycle of active learning experiences with flexibility as the key to effective learning and satisfactory outcome. The cycle begins with a concrete experience, observing and reflecting on the experience, assimilating reflections and observations into abstract concepts, and testing new ideas by active experimentation.

Kolb proposes that career exploration is a process of learning about self and the world of work. In exploring oneself, individuals may proceed through the cycle by self-assessment, evaluating interests, needs and values,

clarifying and planning, and decision making and risk-taking. In exploring the world of work, individuals may gather information about occupations, evaluate the necessary skills and qualities, analyze and integrate information (about self and occupations), and develop and implement strategies for career planning and ultimate career choice. During the cycle individuals gather career information from the environment through appropriate tasks and process this information at their own learning level which may extend from observation to active participation.

One of the appropriate tasks or activities when individuals are at any of the learning levels of self-assessment, gathering information about occupations, evaluating, clarifying, analyzing and integrating this information is the use of computerized programs.

Computer-Assisted Interventions

In an analysis of career indecision among college and university students, Hamel (1985) cites several studies that report the concern of students about their educational and vocational development. These concerns are often expressed by numerous requests for assistance to career counselling services. Most universities provide a diversity of information resources, programs and techniques which contribute to effective career planning services (Gysbers, 1984; Reardon, 1984).

Computerized career guidance programs seem to be effective in assisting students in their career planning, and to be a positive supplement to existing career development programming (Campbell, 1983; Garis & Niles, 1990). Results of several studies indicate that some computerized career guidance programs enhance career decision making of college and university students (Cochran, Hoffman, Strand, & Warren, 1977; Fukuyama et al., 1988; Garis & Hess, 1989; Pinder & Fitzgerald, 1984). For college students involved in the career decision-making process, Blustein (1989) feels that interventions that provide encouragement for exploratory activities seem to be very useful. Interventions that facilitate internal or self-exploration may be more useful in the early stages of career development, and interventions that facilitate external or options exploration may be more useful in the latter stages.

Studies have also measured the usefulness of computer career guidance programs compared to individual career counselling, a combined computer-counsellor approach, and other career interventions (Fretz, 1981). The studies indicate that all forms of treatment had a positive effect upon the self-rated progress of participants in educational and career planning. However, different interventions may have different effects.

One of the computer guidance systems that is used extensively in Canada and frequently in the United States is

CHOICES (Jarvis, 1988), created by the Canadian Employment and Immigration Commission. In addition to occupational information, CHOICES has a strong emphasis on guidance. Pinder and Fitzgerald (1984) examined the effectiveness of CHOICES in promoting career decision making. Their results indicated that the utilization of CHOICES as a treatment was helpful to both male and female university students in increasing the career decision-making commitment and in the removal of barriers which prevent individuals from making career decisions.

Several American computer programs teach a decision-making process in addition to providing information and guidance. One of the popular American computer programs, DISCOVER (Rayman & Bowlsbey, 1977), was unique in increasing levels of vocational differentiation. This may suggest that DISCOVER increased the number of perspectives that students use in making vocational decisions (Fukuyama et al., 1988).

In a sample of motivated, lower division undergraduate students, Fukuyama et al. (1988) found that the level of career indecision was significantly reduced following the use of DISCOVER in the students' career exploration. Tiedeman and Miller-Tiedeman (1984) have identified the level of career decision as an important variable in career development. Chartrand and Robbins (1990) found that intervention outcome studies support different modes of interventions for clients that experience different types of

career indecision.

In a study of computerized information systems, Gerardi and Benedict (1986) found that college students who used the program SIGI (Katz, 1974), had a clearer understanding of their values and goals, had more definite career plans, and were advanced in decision making. If the components of career decision making include self-knowledge, accurate occupational information, and effective strategies for analyzing and integrating data, it appears to Burke and Benedict (1984) that computer-based career information systems are more efficient than manual systems.

One of the questions raised in a study by Roselle and Hummel (1988) was whether or not students can use the computer guidance systems effectively on their own. A study of undergraduate college students who were briefly exposed to SIGI (Cochran et al., 1977) showed positive changes on measures of the decision-making stage related to choice of a college major, but no changes on measures of decision making related to choice of occupation.

In a survey of institutions that included colleges and universities, Sampson et al. (1987) found that computer-assisted career guidance systems are generally being used as a component of existing interventions and supplemented with additional information resources. In an evaluation of the two popular career guidance systems, SIGI and DISCOVER, Kapes, Borman and Frazier (1989) concluded that they both

should be used in conjunction with other career guidance programs and activities. Block and Kinnison (1989) similarly evaluated five computer-based systems, all of which received similar favourable ratings.

Advantages of Computer Interventions

In a selective review, Cairo (1983) concluded that computer-assisted guidance systems are helpful in promoting an awareness of the need for career planning. These systems also facilitate the acquisition of career information and the process of career decision making. In addition, users of the system report that systems are understandable and enjoyable to use.

Integration of traditional and computer-assisted interventions allows for introduction, adequate assessment and follow-up activities that will ensure appropriate use of information resources (Sampson & Pyle, 1983). Such integration also reduces the possibility that students will perceive the computer as having the magical solution to career decision making (Sampson et al., 1987).

Additional advantages to computerized career guidance systems include easy access to current, up-to-date information, quick self-assessment and a user-friendly process that always produces a list of occupations (Roselle & Hummel, 1988).

Research studies (McKee & Levinson, 1990) suggest that client attitudes are favourable toward computerized

assessments. These approaches are cost effective and as efficient as traditional assessments; they also save time and simplify tasks.

Concerns of Computer Interventions

In addition to the advantages of computerized career guidance programs cited by Roselle and Hummel (1988), they also cite a potential disadvantage. Students who use the program can complete the process of self-assessment, input of information into the computer, and generate a list of occupational titles without understanding how the list was created or why the occupations are suitable. Cairo (1983) also adds that the sophistication and convenience of computers may lead to assumptions about their usefulness.

Zachary and Pope (1984) raised both technical and ethical concerns regarding computerized assessment. Users of computerized instruments may presume that interpretive statements generated are accurate and objective rather than using these statements as tentative hypotheses which must be supported and confirmed with additional data. The risk of inappropriate use and interpretation of assessment data are further increased if unqualified persons are helping the user.

This point is especially crucial for disabled persons who require assistance to read or respond to items on a computerized assessment. Sampson (1990) points out that intermediaries may bias a person's response by the way in

which items are introduced or by the person modifying the response to please or displease the intermediary.

Krumboltz (1985) cautions career counsellors using computers to be sure the data in the programs are accurate, that the instructions for processing that data are easily understood, and that students are aware that what appears true for the average may not necessarily be true for them.

Summary

Changes in the economy and in technology have added new dimensions to the type of assistance offered by university career centres. With restraints on university budgets, career centres are looking for the most effectual and efficient ways to provide career planning assistance to their students.

In an annual review of career counselling and development, Spokane and Hawks (1990) state that computers are becoming a standard intervention component and that students now expect and want such an intervention. Because of the increasingly competitive labour market, students want and need high quality, current occupational information (Mauer & Gysbers, 1990).

Gray and Braddy (1988) have emphasized the importance of studying which interventions in career planning achieve their effects and how to optimize these effects with precise and systematic research. In this study, the effectiveness

of one particular computer program, PC DIRECTIONS, in promoting career planning and career exploration of university students will be examined.

CHAPTER III: METHODOLOGY

Context of the Study

The purpose of this study was to investigate the effectiveness of PC DIRECTIONS in promoting career planning of university students. The drop-in service in the Counselling Centre at Brock University offers assistance in career planning to students and graduates through Career/Placement Services. This assistance is provided within the framework of the career planning process. This process includes developing an awareness of oneself (i.e., interests, skills, aptitudes, values, needs); developing an awareness of occupations; choosing alternatives and making decisions; and developing job search strategies.

One method that is offered as the first step in the process involves completing a written assessment compiled by the Counselling Centre of one's interests, skills, values, needs and preferred working conditions. On the basis of the assessment, an ideal job description can then be outlined and job titles generated. The second step involves researching the world of work and identifying careers that are similar to the ideal job description. Students are directed to relevant materials in our resource library during this step. The third step involves choosing alternatives and making decisions according to the types of careers that match the ideal job description. The fourth step involves developing strategies for job search, and

includes writing a resume and cover letters and enhancing interview skills.

Our computer guidance program, PC DIRECTIONS, is another method that a student can utilize to explore his or her self as the first step in the career planning process. PC DIRECTIONS also gives descriptions of occupations which enables students to explore occupations of interest and proceed to the third step of decision making.

Sample Selection

Brock University is a mid-sized university by Canadian standards located on the Niagara Escarpment overlooking St. Catharines, Ontario. The enrollment in the fall of 1991 was 10,332 full- and part-time undergraduate students and 793 graduate students. Sixty percent of the students were female and 40 percent of the students were male. Brock offers undergraduate degree programs through the faculties of Business, Education, Humanities, Maths and Sciences, Physical Education and Recreation, and Social Sciences. Although several graduate programs are offered, 87% of the graduate students were enrolled in Education.

Twenty-four students (18 women and 6 men) who requested career assistance through PC DIRECTIONS during a fall semester at the drop-in service in the Counselling Centre were invited to participate in a career planning research study. Based on statistics of previous years, the average

number of students who use the drop-in service for career assistance each semester is 250 students. These students include undergraduate and graduate students, and full- and part-time students. (Full-time students are enrolled in a minimum of three and one-half courses.) The entire student body was represented in this study. Participants included 18 full-time students and 6 part-time students. Students ranged in age from under 20 years to over 40 years. The mean, median, and mode age range were all from 20-24 years. Twenty-three students were undergraduate students and one student was a graduate student. Fifteen major areas of study were represented in the sample.

Consent forms for the purpose of research were signed prior to the research study (see Appendix A). Anonymity was maintained throughout the study.

Research Design

A one-group pretest/posttest design (Best & Kahn, 1989) was used in the research study. All students who volunteered to participate in the study were given a pretest and a posttest, and they utilized the computer program as the career planning treatment method. The original intent was to use a true experimental design. However, students who expressed an interest in the study were unwilling to be assigned to a control group.

Treatment Method

PC DIRECTIONS (Anderson, Welborn, & Wright, 1987) is a computer guidance program designed as a current and comprehensive method of assisting in career decisions. It was designed to fill the gap in areas identified in other career guidance programs. These areas were identified as: assistance in narrowing occupational options based on individual input; data base of postsecondary education anywhere in Canada; and sources of financial aid for students.

As an interactive computer guidance program, PC DIRECTIONS performs two primary functions. First, it provides self-assessments in the areas of interests, aptitude, temperament, educational level and preferred working conditions. The assessment is completed on a one-page User Information Outline (see Appendix B) in approximately 30 minutes with the assistance of the PERSONAL CAREER DIRECTIONS User Guide (Anderson, Welborn, & Wright, 1988) which explains each factor on the outline. The second function of PC DIRECTIONS is to supply occupational information pertaining to over 1,000 occupations.

The data bank of occupations, including descriptions, is based on the Canadian Classification and Dictionary of Occupations (CCDO) (1987). The CCDO was originally produced by the Department of Manpower and Immigration, now Employment and Immigration, Canada (Occupational and Career

Information Branch). The system was based upon and incorporates features of the Dictionary of Occupational Titles (DOT) (1977), the recognized classification of occupations utilized by the United States Department of Labour. The first publication of the CCDO in 1971 has been updated several times in a series of booklets. The most recent publication, 1988 CCDO Guide (Eighth edition), contains a complete index of all 30,000 CCDO job and occupational titles and new occupational descriptions.

The CCDO is a systematic and comprehensive classification and description of Canadian occupations. It is structured on a four-level system of occupational categorization: Major Group, Minor Group, Unit Group, and Individual Occupations. Each level provides successively finer detail and is designated by its code in a seven-digit number. An individual occupation is identified by the seven-digit code number and a title, e.g., 2731-110 teacher, elementary school. The first two digits indicate the code number of one of 23 Major Groups which identifies occupations on a broad basis, e.g., 27 Teaching and Related Occupations. Each Minor Group has distinguishing characteristics indicated by a three-digit code number, e.g., 273 Elementary and Secondary School Teaching and Related Occupations. Each Unit Group of related occupations is indicated by a four-digit code number, e.g., 2731 Elementary and Kindergarten Teachers. The full seven-digit

number indicates the exact location of the occupation within the classification structure. Detailed descriptions of specific occupations are available in a series of booklets.

PC DIRECTIONS enables the user to generate lists of occupations, from the data bank of 1,000 CCDO occupations, that match his or her factors. Users can also obtain job descriptions of any occupations that appeal to them. Students generally spend about one hour on this part of the program. PC DIRECTIONS is used most often in conjunction with other career resources such as the CCDO.

The program also includes information on colleges and universities in Canada, including financial aid and facilities for the disabled. This part of the program was not included in the study but students were given the option of returning to use any sections of the program at their convenience. Students can produce and retain copies of the output from PC DIRECTIONS at any time during the program (see Appendix C).

Instruments

Progress in career planning was measured by one instrument and two self-report procedures:

1. The Career Development Inventory (College and University Form) (CDI) (Super et al., 1981). This inventory has been used effectively in measuring outcomes of career planning and computer-assisted guidance services. The CDI

was developed by Super et al. (1981) following a 20-year study of career patterns. The CDI is divided into five sections. Two scales measure self-reported accomplishments in career planning, and three scales measure competencies in career management. This study used the first two scales of 20 items each which combine to assess career development attitudes of Career Planning (CP) and Career Exploration (CE).

Thompson, Lindeman, Super, Jordaan, and Myers (1981, 1982) provide evidence of the reliability of the CP scale and CE scale of the CDI as a measure of career development attitudes. Internal consistency is estimated by Cronbach's alpha coefficient. Scales for all years of undergraduate students on CP have an average alpha of .91 and on CE have an average alpha of .80. The CP and CE scales are highly intercorrelated and share factor loadings, and combine to measure Career Development Attitudes (CDA). Scales for all years of undergraduate students on CDA have an average alpha of .86. This indicates the CP, CE, and CDA scales may be useful both for individual counselling and the analysis of group differences. The authors also report that scores of the CDI are highly stable over periods of up to six months.

Thompson et al. (1981, 1982) also report on the content validity and construct validity of the basic dimensions measured by the CDI, specifically CP and CE. As viewed by qualified judges who are specialists in career development

research, the items of CP assess a planning orientation to careers and the items of CE assess the use of resources in career exploration. Evidence of the CDI's construct validity for each scale is reported based on subgroup differences of year, sex and major field. The means on the CP scale and CDA scale increase from the freshman to the senior year as expected since career maturity is a developmental characteristic. The means on the CE scale decrease from the freshman to the senior year which indicates a greater concern for career exploration in the beginning undergraduate years and less activity in exploration as career goals are developed. The authors also refer to the lack of consistent sex differences in attitudes as an indication that equal attention is given to careers by both sexes. Differences did occur in means between students in different major fields. Students in occupationally oriented programs tended to score higher in career attitude scales because these students had planned for their chosen career, had used resources for career exploration, and were already committed to a specific career.

The CDI has received generally favourable reviews of the construct and criterion-related validity (Hansen, 1985; Pinkney, 1985). In addition, the CDI has been adapted for use in several countries, including Canada, and research on cross-cultural research supports the generalizability of the instrument (Betz, 1988).

2. A self-report list of job titles and several informal open-ended questions. Henerson, Morris, and Fitz-Gibbon (1978) propose that self-report procedures represent the most direct type of attitude assessment. This type of procedure is appropriate if the people whose attitudes you are investigating are likely to answer honestly and have sufficient self-awareness to recognize their own beliefs and feelings and provide the necessary information. It is useful to double check self-reports through another of the measurement approaches.

In addition, Henerson et al. (1978) present several precautions that we must keep in mind when measuring attitudes. First, since attitudes cannot be measured directly, we are relying on inference. Second, behaviours, beliefs and feelings may reflect a single attitude but they may not always match. Third, attitudes may fluctuate over time. Finally, there may not be universal agreement on the nature of certain attitudes.

Procedure

All students who volunteered to participate in the study were asked to generate as many job titles as possible that they had considered for a future career, and to complete the 40 items of the CP and CE scales of the CDI. The list of job titles was attached to the CDI and consecutive numbers were assigned to each participant.

Demographic information included age, gender, number of courses completed, full- or part-time student, previous career planning assistance, and major area of study (see Appendix D).

Individual appointments were set up with each student. Thirty minutes were allotted to complete the User Information Outline of PC DIRECTIONS and one hour to enter their responses on the outline into the computer with the help of the researcher. Students were also asked to respond to several informal questions upon completion of the computer program (see Appendix E).

Students were given a brief overview of the resources for career planning and told they were free to use the material in the resource library at any time. This is standard procedure for students who seek career assistance in the Counselling Centre.

After several weeks, students were asked to return to the Counselling Centre. They were again asked to generate as many job titles as possible that they consider for a future career, and to complete the CP and CE scales of the CDI. Pretesting, treatment and posttesting were completed in eight to twelve weeks.

Limitations of the Study

Several limitations are noted in the design of this study. Since students were not willing to wait until after

the study was complete to use PC DIRECTIONS, there was no control group. In addition, only those students who expressed an interest in PC DIRECTIONS participated in the study which resulted in a small, self-selected sample of students. The length of time required to spend with each student also limited the number of students.

Data Collection & Recording

All completed instruments were collected by the researcher. The researcher recorded the data in computer files by the number assigned to each student.

Data included the list of job titles generated and scores on the CP and CE scales of the CDI recorded before completing PC DIRECTIONS and eight to twelve weeks after completing PC DIRECTIONS. Demographic data and responses to the questions asked upon completion of PC DIRECTIONS were also coded and recorded.

Data Analysis

Data were compiled and analyzed using a paired samples two-tailed t test to determine if there were significant differences between the pretest and posttest scores for the CP scale and CE scale of the CDI and for Career Development Attitudes (CDA), a combination of the CP and CE scales.

Pearson product moment correlations were calculated between the CP scale and the CE scale. The results were

consistent with the high intercorrelation of the two scales reported by Thompson et al. (1981, 1982). Further analyses combined the CP and CE scales for a measurement of CDA.

Descriptive statistics consisting of means and standard deviations of scores for pretests and posttests were calculated. Means and standard deviations of scores according to gender, age, full- and part-time student, number of courses completed, and previous career planning assistance were also calculated. Means and standard deviations of scores were not calculated according to major area of study since the numbers of students in each major area were too few.

Lists of job titles and responses to the informal questions were treated as qualitative data and classified and analyzed as proposed by Henerson et al. (1978). The first list of job titles that each student generated prior to using PC DIRECTIONS was compared to the second list of job titles generated several weeks after using the program. The comparison of the lists revealed a pattern that allowed for classification of the responses into five categories. Categories for comparing job titles were defined as: definite titles, more specific titles, titles added in similar occupational areas, titles changed to different occupational areas, or titles remained the same.

In addition, the students' responses to open-ended questions following the use of PC DIRECTIONS were classified

into three categories that identified their attitude to each question as positive, uncertain or negative. These categories were confirmed by a second judge. Frequency counts and percentages for each response were calculated.

Results of these analyses are presented in Chapter Four.

CHAPTER IV: RESULTS

The purpose of this study was to assess the effectiveness of a computer guidance program, PC DIRECTIONS, in promoting career planning attitudes of university students. Progress in career planning was measured in pretest to posttest sequence by two scales of the Career Development Inventory (College and University Form) (CDI) (Super et al., 1981), and self-report lists of job titles. Student attitudes and feelings were assessed by their responses to questions asked upon completion of PC DIRECTIONS.

Table 1 displays the means and standard deviations for scores on the pretest and posttest of the Career Planning (CP) and Career Exploration (CE) scales of the CDI. In addition, the means and standard deviations for scores on the pretest and posttest of Career Development Attitudes (CDA), combining CP and CE, are also displayed.

Results of correlational analysis indicate significant relationships between the CP and CE scales on pretest and posttest scores. Table 2 displays the positive correlations between the CP and CE scales of the CDI for pretest and posttest scores. The possible range of scores for the CP scale is 20-100, and the possible range of scores for the CE scale is 70-280.

Descriptive statistics by demographics are displayed in Table 3. Differences are presented in means and standard

Table 1.

Descriptive Statistics for Scores on
Career Development Inventory (N = 24).

Scale	Pretest		Posttest	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Career Planning	71.21	16.12	77.71	13.16
Career Exploration	190.00	30.55	206.00	35.04
Career Development	261.21	43.07	283.71	44.61
Attitudes				

Table 2.

Correlations Among Career Planning (CP) and
 Career Exploration (CE) Scales for Pretest (PRE)
 and Posttest (POST) (N =24).

	CPPRE	CPPOST	CEPRE	CEPOST
CPPRE	1.00			
CPPOST	.73*	1.00		
CEPRE	.67*	.51*	1.00	
CEPOST	.60*	.64*	.74*	1.00

* Significant at $p < .01$.

Table 3.

Descriptive Statistics by Demographics for
Career Development Attitudes (CDA)

Category	Pretest		Posttest		<u>N</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Gender					
Female	269.17	45.37	290.17	44.23	18
Male	237.33	24.97	264.33	43.62	6
Age					
Under 20	271.00	.00	265.00	.00	1
20-24	261.68	47.40	279.26	46.05	19
25-29	222.00	.00	301.00	.00	1
30-34	261.00	.00	336.00	.00	1
Over 40	271.50	19.09	300.50	57.28	2
Full/Part Time					
Full Time	258.00	45.52	282.83	46.33	18
Part Time	270.83	36.58	286.33	42.93	6

(table continues)

Table 3. (continued)

Category	Pretest		Posttest		<u>N</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Courses Completed					
0-5	235.50	29.03	242.67	27.86	6
6-10	237.80	21.79	265.00	31.55	5
11-15	279.57	54.88	307.00	44.39	7
16-20	274.67	35.73	311.67	21.08	3
Over 20	300.50	51.62	301.50	57.28	2
Graduate	285.00	.00	341.00	.00	1
Brock Counselling Centre					
Yes	282.92	40.51	305.77	41.30	13
No	235.55	30.97	257.64	33.91	11
High School					
Yes	276.00	42.71	296.06	39.19	16
No	231.63	26.16	259.00	46.92	8
Other					
Yes	264.80	26.57	306.60	47.18	5
No	260.26	47.00	277.68	43.18	19

deviations for gender, age, full- and part-time students, number of courses completed, and previous career planning assistance in three categories: Brock Counselling Centre, high school, or other assistance. Examination of Table 3 reveals an increase in mean scores from pretest to posttest for both gender category and full- and part-time category. The mean scores for pretest and posttest were higher for females than for males, and higher for full-time students than part-time students. In the age range category, the students were primarily from 20-24 years. The mean scores in this age range increased from pretest to posttest. In each of the other age levels, the small number of students is too low to determine differences in means.

Examination of Table 3 also reveals an increase in mean scores from pretest to posttest for both the number of courses completed category and the three previous career planning categories. The mean scores for pretest and posttest increased as the number of courses increased, from 0-5 courses to the one graduate student. The mean scores increased from pretest to posttest for the three previous career planning assistance categories. The mean scores in each of the three categories were higher for students who had previous assistance than for those who did not have previous assistance.

Students who participated in the study represented a range of major areas of study. The following areas of study

were represented: Four students each in Business and Psychology; two students each in Communications, Sociology, and Biology/Psychology; one student each in Accounting, Canadian Studies, English as Second Language, General Studies, History, Mathematics, Business/Sociology, Chemistry/Physics, Child Studies/Psychology, and Psychology/Sociology.

A paired samples two-tailed t test was used to investigate the difference between the pretest scores and posttest scores for Career Development Attitudes (CDA). The posttest scores for CDA were significantly higher than the pretest scores for CDA, as displayed in Table 4.

In addition to the scores for Career Development Attitudes, the first list of job titles that each student generated prior to using PC DIRECTIONS was compared to the second list of job titles generated several weeks after using the program. The comparison of the lists revealed a pattern that allowed for classification of the responses into five categories. Categories for comparing job titles were defined as: definite titles, more specific titles, titles added in similar occupational areas, titles changed to different occupational areas, or titles remained the same.

Four students were definite about a specific job title. For example, one student initially listed Police Work as a job title. Following PC DIRECTIONS and talking to resource

Table 4.

Paired Samples Two-tailed t Test for
Career Development Attitudes (CDA)

Source	Pretest		Posttest		<u>t</u>	<u>df</u>	<u>p</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>			
CDA	261.21	43.07	283.71	44.61	3.74	23	.001

people at Careers Day, the student indicated a definite interest in Fire Marshall as a job title.

In their second lists, four students listed similar job titles to their first list but indicated they were more focused and more specific about their job titles and their area of interest. For example, one student initially recorded an interest in a Marketing/Management position in the chemical or pharmaceutical industry. The job title on the second list indicated a similar interest in this field but more specifically in the direction of business rather than chemistry. Another student indicated specific interest in occupations generated from PC DIRECTIONS that were also an area of interest on the initial list. For example, the initial list included Residential Counsellor and Assistant in Social Services. The list of job titles following PC DIRECTIONS included Detention Home Counsellor and Caseworker.

Eight students expanded their list of job titles in the weeks following their use of PC DIRECTIONS by adding job titles that were in similar occupational areas as the job titles in the first list. For example, a student initially interested in Occupational Therapy, Respiratory Therapy, and Nursing, added Radiography and Communicative Disorders Assistant to the second list. Students who listed Counsellor on their first list, expanded their second list to include Rehabilitation Counsellor, Employment Counsellor,

and Life Skills Director.

Three students changed their list of job titles to occupational areas that were different from their first list. For example, one student listed Occupational Therapy on both lists but noted that current grades would not be high enough for entrance into the program. Several other job titles were added in other fields that were of interest. Another student noted that Police was added to the second list because of being granted an interview in this field and willing to "take anything now."

Six students listed job titles on their second list that were exactly the same as their initial list and made no comment about being more specific. In fact, one student commented, "I haven't given it much thought."

Student responses to each open-ended question following the utilization of PC DIRECTIONS were classified into three attitude categories: positive, uncertain and negative. These results were confirmed by a second judge. Table 5 displays the frequency counts and percentages for each response. Positive responses ranged from 37.5% in answer to "Do the results surprise you? Why?" to 75% in answer to "How helpful was the program to you?"

In response to their feelings about the program, positive answers were "helpful," "excellent," "comfortable," "informative," "interesting," "fun," "quick," and "it's neat." Students who were uncertain about their

Table 5.

Distribution of Responses to Follow-up Questions For
Personal Career Directions (N = 24)

Question	Response		
	Positive	Uncertain	Negative
1. How do you feel about the program?	15 (62.5%)	7 (29.2%)	2 (8.3%)
2. How helpful was the program to you?	18 (75.0%)	3 (12.5%)	3 (12.5%)
3. How do you feel about the results?	13 (54.2%)	6 (25.0%)	5 (20.8%)
4. Do the results seem realistic?	16 (66.7%)	6 (25.0%)	2 (8.3%)
5. Do the results surprise you? Why?	9 (37.5%)	12 (50.0%)	3 (12.5%)

Note. Numbers in parentheses are percentages of responses.

feelings responded with phrases such as "good, but too many factors involved that change outcome drastically," "good alternative but not specific enough," and "should be more personal." Students who had negative feelings about the program responded, "hasn't helped me; I thought it would confirm occupations I was thinking of or give something else that was really great", and "very general, just numbers that do not reflect me."

Positive responses to how helpful was the program included "really helpful in actively participating to do something about choice," "reinforced choices," " validated what expected and hoped for in future careers," "helped me to look toward career goals," "generated job titles not considered but can see myself in, therefore, eyes open for different positions." Uncertain responses included "not helpful, but opened my eyes to other fields," and "gives idea of area but not specifics." Students who were negative responded that the program was not very helpful.

Positive feelings about the results included "realistic," "pertinent, gives confidence," "reinforced what generated initially," and "pretty precise, nothing shocking, consistent." Students who were uncertain about their feelings expected to have their choices reinforced by the program, or were pleased with some of the occupations listed, but stated that "others were not accurate for me" or that "some were disappointing." Negative feelings about the

results included "having to manipulate the computer to get results."

Half of the students indicated uncertainty about whether or not the results surprised them. In some cases, occupations were in areas they had not considered. In other cases students did not feel they had qualities that matched the occupations. Students who expressed positive surprise at the results were pleased if the results confirmed their expectations or gave job descriptions consistent with what they wanted in a job. Students who expressed negative surprise were not happy because the results did not include occupations they had considered.

The results indicate that posttest scores of career development attitudes are significantly higher than pretest scores following the use of PC DIRECTIONS, as measured by the CDI. The results of comparing the lists of job titles prior to using PC DIRECTIONS and several weeks after using PC DIRECTIONS indicate positive changes in the lists generated. In addition, responses to questions following using PC DIRECTIONS indicate student attitudes are generally favourable toward using the computer program to facilitate career planning and exploration. These results will be discussed in Chapter V.

CHAPTER V: DISCUSSION

Discussion of Hypothesis

The results of this study support the hypothesis that use of the computer program, PC DIRECTIONS, has a positive effect in career planning and career exploration for university students. Results of paired samples two-tailed t test indicate a significant positive difference between pretest and posttest scores of CDA which combines the CP scale and CE scale of the CDI. This demonstrates that interaction with the computer program may promote career development attitudes of university students. Support for the hypothesis is also evident in evaluating both the self-report list of job titles and the responses to open-ended questions on students' attitudes toward using PC DIRECTIONS.

Discussion of Questions

Several questions were addressed during the course of the investigation:

1. Can the computer program effectively assist students in the career planning process?
2. Will the utilization of a computer program influence attitudes by providing information that helps individuals with effective career planning?
3. Are there implications that a computer program will have different effects for different types of students in exploring career options?

4. Are there implications that the computer program might have an effect on the way in which students explore career options?

The results of the scores of the CDI, and the evaluation of the lists of self-report job titles and the responses to questions following utilization of PC DIRECTIONS suggest that the computer program was effective in assisting students in the career planning process. Moreover, the results are consistent with research studies that indicate that interventions in career planning have a positive influence for university students (e.g., Baker & Popowicz, 1983; Pinder & Fitzgerald, 1984; Spokane & Oliver, 1983).

The changes from the list of job titles that each student generated prior to using PC DIRECTIONS and the list of job titles generated several weeks after using the program reveal a pattern to the job titles. This pattern allows for classification of the list of job titles generated after using PC DIRECTIONS into five categories, defined as: definite titles, more specific titles, titles added in similar occupational areas, titles changed to different occupational areas, or titles remained the same. The pattern leads to implications that students may be at different stages of career development. Students who are definite or more specific about their job titles may be at a higher level of cognitive processing in their career

decision making as Perry (1970) and Knefelkamp and Slepitz (1976) have identified, or progressing toward their vocational self-concept as Super (1963) has identified. Students who make changes in their lists may be in the early stages of the career planning process, or at a less definite level in their career decision making. They may not have sufficient information to assimilate and synthesize in order to make their career decisions, and they may benefit from a more indepth assessment. Students who do not change their lists may simply feel that they are not ready or it is not necessary to come to a definite decision at this time.

Evidence that different strategies are used to explore career options with a computer program is consistent with decision-making models that are relevant in the context of career development and career choice. Gati and Tikotzki (1989) found differences in strategies that people used in the exploration of occupational information. Some people expand their list of career options, others eliminate options by occupational groups in the early stages of exploration if the number of choices is large. Once an appropriate list of choices has been determined, most people examine their choices selectively to determine the suitability of each choice. Some students in this study expanded their career options by adding job titles in similar occupational areas, whereas other students narrowed their list and became more definite about a specific job

title or more focused in their choice of occupations and their area of interest. Several students changed their list of job titles to other occupational areas. Those students who changed their job titles did so for specific reasons and may have been further along in the exploration stage. They may have been weighing their alternatives to determine the relevance of the occupation at this time; for example, realizing that grades are not high enough for entry into a specific program, or willing to take what the present job market has to offer. Students who recorded the same list of titles were either satisfied with their titles or not prepared to think about appropriateness of their titles at this time.

The results of the study also indicate that the utilization of a computer program helps individuals in assessing their interests, aptitudes, temperaments, and preferred working conditions, and provides information for exploring traits of occupations. This information is essential in models of career decision making which identify steps or sequences of decisions including assessment of oneself, gathering occupational information, and assimilating and integrating this information in order to make career choices (Harris-Bowlsbey, 1983).

The meta-model of career exploration proposed by Atkinson and Murrell (1988) considers individual differences and provides an organized process to gathering relevant

career information based on Kolb's (1984) experiential learning theory. Included in this process are tasks and activities to assist individuals to assess the world of work and their own interests, values, needs and wants. The results of this study indicate that PC DIRECTIONS assists students in becoming involved in the process at different stages of the learning cycle.

Students who find PC DIRECTIONS helpful for assessing their interests, aptitudes, temperment, preferred working conditions, and educational goals may be at the concrete level of their learning experience. Students at the reflective cycle may be evaluating their career goals, and matching their interests and personal qualities with those required by occupations. Holland (1973) has also stipulated that individuals seek occupations that are congruent with their interests and aptitudes. However, several students feel they had to manipulate the computer in order to reinforce those job titles that they initially generated. These students may be at the reflective cycle in the process. In their evaluation of their choices, they are looking for confirmation from the list generated by the computer. In wanting to reinforce their choices, students may be beginning to implement Super's (1963) idea of their vocational self-concept. Students who may be at the abstract level, gather information about occupations and analyze and integrate the information with their assessment

of themselves. In some cases, the list generated from PC DIRECTIONS reinforces their choices. In other cases, PC DIRECTIONS gives them other occupational areas which previously they had not considered. Even those students who express uncertainty or disappointment with the outcome of PC DIRECTIONS, will possibly consider other occupational areas and be motivated to further exploration of their career choices. This would account for the higher mean scores from pretest to posttest in all categories, and the positive difference between pretest and posttest scores in CDA.

The responses to questions following use of PC DIRECTIONS demonstrates that PC DIRECTIONS provides information to help with effective career planning and that student attitudes toward using a computer program are more positive than negative. Students who have an overall positive attitude to the program find the program helpful, quick, interesting and fun. In a review of studies to evaluate computer-assisted guidance systems, Cairo (1983) reports on the popularity of these systems. Examples of reactions by users of the systems include interesting, enjoyable, easy to use, and valuable.

Many of the students who used PC DIRECTIONS feel they are actively participating in their career choice. The results confirm the students' career choices, give them some new career areas to consider, or give them a place to start. Students who are positive find the results realistic and

consistent. Students find the job descriptions which identify the attributes required by the occupation helpful for comparing these attributes to their perceptions of their own attributes.

Uncertain attitudes toward the results reflected expectations of students who are disappointed that their choices were not listed and reinforced by the program. Uncertain attitudes also reflected satisfaction that some of the occupations were listed but dissatisfaction with others that were not considered suitable. Some of the students who are uncertain would consider the general career area but not the specific occupation listed. Uncertain responses also indicate that the computer program is an alternate method of self-assessment but not personal or specific to individual students.

The students who provided negative responses are very definite that the program neither helped with new ideas for careers nor confirmed their expectations of careers that they perceive as suitable. Some students who provided negative responses feel they had to "manipulate" the computer in order to get realistic results. It is possible that these students were at Perry's (1970) stage of career development and seeking confirmation from their external environment (the computer) to provide the answer to the right career. Negative responses may also reflect those students who have what J. L. Holland and J. E. Holland

(1977) have identified as indecisive dispositions. They may comprise the small percentage of students that have personal characteristics or attitudes to such a degree that inhibit any effective outcome from brief career planning interventions. They may be lacking in self-confidence, sense of identity, knowledge to cope with career choices, or decision-making skills, as well as facing other complex problems.

Cairo (1983) proposes that users' career development needs may differ. Some students who have extensive lists are interested in more specific information. These students find the job descriptions helpful in narrowing down their alternatives. Other students are interested in expanding their lists by adding titles in similar occupational areas. Other students want reinforcement from the computer that their choice of occupation matches the attributes they entered into the computer. In attempting to accommodate different needs, students were given the option of returning to use the program at their convenience. Cairo (1983) proposes that the time spent using a computer guidance program may affect the gains made in the career choice process.

Blustein, Ellis and Devenis (1989) point out that a prominent theme in the career development literature is that individuals progress through a series of phases from being relatively uncommitted to career choices to a firm and

confident level of commitment. In the early stages of the process, individuals may be unsure of making career decisions. As they progress to the early stages of making a commitment, there is a need to explore information about themselves and the occupational environment in order to gain confidence in making choices (Harren, 1979; Jordaan, 1963; Super, 1957; Tiedeman & O'Hara, 1963). Students may be at various stages of deciding on a career choice, and they may, in fact, be anxious or confused. Individuals may also be at one stage of decision making for one type of decision (e.g., choice of major) and at a different stage for another pending decision (e.g., choice of future career) (Cochran et al., 1977). Career indecision is a common concern for students and young adults and some aspects of indecision are normal stages of the career development process (Slaney, 1988).

Implications for Further Research

The design of the study required that the researcher spend approximately two hours with each student on pretesting, assisting with interaction of the computer, recording responses to the questions following use of the computer, and posttesting. This requirement limited the number of students that could be tested and resulted in several limitations of the study. One of the limitations is the potential for generalization based on 24 students. Additional limitations because of insufficient numbers are

that further analyses on demographic categories were not conducted. However, differences in mean scores from pretest to posttest in each category imply that further research may reveal differences in career development attitudes according to gender, age, full- or part-time student, major area of study, and number of courses completed.

The differences in the pretest and posttest scores, the differences of the self-report list of job titles, and the responses to the questions asked after using PC DIRECTIONS suggest that students may be at different levels of career development.

Differences in intellectual development related to career development has been another area for investigation in studies of interaction effectiveness with a computer-assisted career guidance system. A study by Roselle and Hummel (1988) found that students with higher levels of intellectual development manipulate the system more effectively than do students with lower levels of development. This implies that it would be helpful to assess the level of intellectual development before the students interact with a computer program. Students who are assessed as low may need help from counsellors as they interact with the computer. Students who are assessed as high in development may need less help and less structure in the assisting process from counsellors.

Implications for Practice

The results of this study support research studies (Fretz, 1981; Pickering & Vacc, 1984) that most short-term interventions for career planning, such as computer-assisted guidance systems, achieve some improvement and result in positive gains. Advantages of short-term interventions are cost-effectiveness in reaching a large number of students who express limited time for career planning. However, caution must be taken to continuously evaluate the appropriateness of using the computer with different types of students and to address various career-related issues (Garis & Niles, 1990). Oliver and Spokane (1988) have suggested diagnostic assessments to determine why clients seek help with career planning and what their goals are in order to determine the most effective treatment to assist them.

Although some students do not want or need assistance, and will cope with making their decisions when necessary, J. L. Holland and J. E. Holland (1977) advocate that most students will be able to make some decisions or at least feel better following career planning treatments. In addition, research studies (Fretz, 1981; Pickering & Vacc, 1984), found that self-help interventions were least effective which may indicate that students require assistance with interventions such as computer programs.

The purpose of this study was to assess the

effectiveness of PC DIRECTIONS in promoting career planning attitudes of university students. Computer programs, such as PC DIRECTIONS, are a useful tool for university career centres that have many demands on their time. However, the implications are that these programs are only supplements to other methods and resources that provide career assistance. This study assessed the effects of PC DIRECTIONS in isolation from other career planning interventions. The results of this study reflect the need for further studies on using the computer program in combination with other career planning methods available to our students, e.g. a self-administering assessment, workshops, Careers Day, and individual assistance.

Conclusions

Many recent studies indicate that computerized guidance programs are among the useful techniques that can assist students in career planning. This study focuses specifically on one computer program, PC DIRECTIONS, which to date, has had no empirical research studies conducted to determine its effectiveness. The results of this study indicate that PC DIRECTIONS is a helpful tool for assisting university students in career planning and exploration activities.

In view of the restraints on university budgets and their counselling centres, it is most beneficial to confirm

the value of PC DIRECTIONS as one of the useful tools offered by our career services. In addition to the initial outlay to purchase the computer program, several hundred dollars are spent annually to update PC DIRECTIONS with current information. Furthermore, the computer program is a relatively short intervention for promoting career planning and career decision making. It provides a quick method of self-assessment and acquiring occupational information. The implications are that PC DIRECTIONS is not a stand-alone process and may be most effective in conjunction with additional career resources and material. Career assistants who help student with career concerns can be trained to help students with PC DIRECTIONS.

Herr and Cramer (1984) have identified guidelines for assisting students in higher education with their career concerns. In addition to assistance in selecting their major field of study, students may need help in career planning in areas of self-assessment and self-analysis; understanding the world of work; decision-making; and access to the world of work. PC DIRECTIONS is a viable addition to the resources and services available to help students with career planning at Brock University's Career/Placement Services.

References

- Alvi, S. A., Khan, S. B., & Kirkwood, K. J. (1990). A comparison of various indices of differentiation for Holland's model. Journal of Vocational Behavior, 36, 147-152.
- Anderson, D., Welborn, D., & Wright, A. (1983). PERSONAL CAREER DIRECTIONS [computer program]. Victoria, BC: SRC Software Research Corporation.
- Anderson, D., Welborn, D., & Wright, A. (1987). PERSONAL CAREER DIRECTIONS [computer program manual]. Victoria, BC: SRC Software Research Corporation.
- Anderson, D., Welborn, D., & Wright, A. (1988). PERSONAL CAREER DIRECTIONS user guide. Victoria, BC: SRC Software Research Corporation.
- Arnold, J., & Masterson, A. (1987). Self-concept certainty, career exploration and readiness for career decision-making amongst undergraduate students. British Journal of Guidance and Counselling, 15(1), 92-96.
- Atkinson, G., Jr., & Murrell, P. H. (1988). Kolb's experiential learning theory: A meta-model for career exploration. Journal of Counseling and Development, 66, 374-377.
- Baker, S. B., & Popowicz, C. L. (1983). Meta-analysis as a strategy for evaluating effects of career education interventions. Vocational Guidance Quarterly, 31, 178-186.

- Best, J. W., & Kahn, J. V. (1989). Research in education (6th ed.). Englewood Cliffs, NJ: Prentice Hall.
- Betz, N. E. (1988). The assessment of career development and maturity. In W. B. Walsh & S. H. Osipow (Eds.), Career decision making (pp. 77-136). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Block, D. P., & Kinnison, J. F. (1989). A method for rating computer-based career information delivery systems. Measurement and Evaluation in Counseling and Development, 22(3), 126-136.
- Blustein, D. L. (1989). The role of career exploration in the career decision making of college students. Journal of College Student Development, 30, 111-117.
- Blustein, D. L., Ellis, M. V., & Devenis, L. E. (1989). The development and validation of a two-dimensional model of the commitment to career choices process. Journal of Vocational Behavior, 35, 342-378.
- Bordin, E. S. (1984). Psychodynamic model of career choice and satisfaction. In D. Brown & L. Brooks (Eds.), Career choice and development: Applying contemporary theories to practice (pp. 94-136). San Francisco: Jossey-Bass.
- Bordin, E. S., Nachmann, B., & Segal, S. J. (1963). An articulated framework for vocational development. Journal of Counseling Psychology, 10(2), 107-117.
- Brown, D., & Brooks, L. (1984). Career choice and development: Applying contemporary theories to practice.

San Francisco: Jossey-Bass.

Burke, M., & Benedict, G. (1984). Making wise vocational choices: Computers can help. Canadian Vocational Journal, 20(1), 29-32.

Cairo, P. C. (1983). Evaluating the effects of computer assisted counseling systems: A selective review. The Counseling Psychologist, 11(4), 55-59.

Campbell, D. P. (1974). Manual for the Strong-Campbell interest inventory. Palo Alto, CA: Stanford University Press.

Campbell, R. B. (1983). Assessing effectiveness of DISCOVER in a small campus career development program (Report No. CG 017 984). The Pennsylvania State University, York Campus. (ERIC Document Reproduction Service No. ED 253 782)

Canadian Classification and Dictionary of Occupations (8th ed.). (1987). Ottawa: Minister of Supply and Services Canada.

Chartrand, J. M., & Robbins, S. B. (1990). Using multidimensional career decision instruments to assess career decidedness and implementation. The Career Development Quarterly, 39(2), 166-177.

Cochran, D. J., Hoffman, S. D., Strand, K. H., & Warren, P. M. (1977). Effects of client/computer interaction on career decision-making processes. Journal of Counseling Psychology, 24, 308-312.

- Crites, J. O. (1969). Vocational psychology: The study of vocational behavior and development. New York: McGraw-Hill.
- Crites, J. O. (1973). Theory and research handbook: Career maturity inventory. Monterey, CA: CTB/McGraw-Hill.
- Crites, J. O. (1976). Career counseling: A comprehensive approach. Counseling Psychologist, 6(3), 2-11.
- Dewey, J. (1938). Experience and education. New York: Macmillan.
- Dictionary of occupational titles (4th ed.). (1977)
Washington, DC: United States Government Printing Office.
- Dunphy, P. W., Austin, S. F., & McEneaney, T. J. (1981). Career development for the college student (5th Ed.). Cranston, RI: Prentice-Hall.
- Fretz, B. R. (1981). Evaluating the effectiveness of career interventions. Journal of Counseling Psychology Monograph, 28(1), 77-90.
- Fukuyama, M. A., Probert, B. S., Neimeyer, G. J., Nevill, D. D., & Metzler, A. E. (1988). Effects of DISCOVER on career self-efficacy and decision making of undergraduates. The Career Development Quarterly, 37(1), 56-62.
- Garis, J. W., & Hess, H. R. (1989). Career navigator: Its use with college students beginning the job search process. The Career Development Quarterly, 38, 65-75.
- Garis, J. W., & Niles, S. G. (1990). The separate and

- combined effects of SIGI or DISCOVER and a career planning course on undecided university students. The Career Development Quarterly, 38(3), 261-274.
- Gati, I., & Tikotzki, Y. (1989). Strategies for collection and processing of occupational information in making career decisions. Journal of Counseling Psychology, 36(3), 430-439.
- Gelatt, H. B. (1962). Decision-making: A conceptual frame of reference for counseling. Journal of Counseling Psychology, 9(3), 240-245.
- Gerardi, R. J., Benedict, G. C. (1986). Computerized information systems. School Counselor, 34(2), 105-109.
- Gianakos. I., & Subich, L. M. (1988). Student sex and sex role in relation to college major choice. The Career Development Quarterly, 36(3), 259-268.
- Ginzberg, E. (1972). Toward a theory of occupational choice: A restatement. Vocational Guidance Quarterly, 20(3), 169-176.
- Ginzberg, E., Ginsburg, S. W., Axelrad, S. W., & Herma, J. L. (1951). Occupational choice: An approach to a general theory. New York: Columbia University Press.
- Gottfredson, L. (1981). Circumscription and compromise: A developmental theory of occupational aspirations. Journal of Counseling Psychology, 28, 545-579.
- Gray, D. O., & Braddy, B. A. (1988). Experimental social innovation and client-centered job-seeking programs.

- American Journal of Community Psychology, 16, 325-343.
- Gysbers, N. C. (1984). Major trends in career development theory and practice. Vocational Guidance Quarterly, 33(1), 15-25.
- Gysbers, N. C. & Moore, E. J. (1971). Career development in the schools. In G. F. Law (Ed.), Contemporary concepts in vocational education (pp. 218-229). Washington, DC: American Vocational Association.
- Hackett, G., Lent, R. W., & Greenhaus, J. H. (1991). Advances in vocational theory and research: A 20-year perspective. Journal of Vocational Behavior, 38(1), 3-38.
- Hamel, H. (1985). An analysis of career indecision among college and university students. Natcon, 8, 175-195.
- Hansen, J. C. (1985). Test review: Career development inventory. Measurement & Evaluation in Counseling & Development, 17, 220-223.
- Harmon, L. W., & Farmer, H. S. (1983). Current theoretical issues in vocational psychology. In W. B. Walsh & S. H. Osipow (Eds.), Handbook of vocational psychology: Vol. 1. Foundations (pp. 39-77). Hillsdale, NJ: Erlbaum.
- Harren, V. H. (1979). A model of career decision-making for college students. Journal of Vocational Behavior, 14, 119-133.
- Harris-Bowlsbey, J. (1983). The computer and the decider. The Counseling Psychologist, 11(4), 9-14.
- Henerson, M. E., Morris, L. L., & Fitz-Gibbon, C. T. (1978).

How to measure attitudes. Beverly Hills: Sage Publications.

Herr, E. L., & Cramer, S. H. (1984). Career guidance and counseling through the life span: Systematic approaches (2nd ed.). Toronto: Little, Brown & Company.

Hesketh, B., Elmslie, S., & Kaldor, W. (1990). Career compromise: An alternative account to Gottfredson's theory. Journal of Counseling Psychology, 37(1), 49-56.

Holland, J. L. (1959). A theory of vocational choice. Journal of Counseling Psychology, 6, 35-45.

Holland, J. L. (1966). The psychology of vocational choice. Waltham, MA: Blaisdell.

Holland, J. L. (1973). Making vocational choices: A theory of careers. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1979). The self-directed search. Palo Alto, CA: Consulting Psychologists Press.

Holland, J. L. (1983). Understanding yourself and your career. (Canadian ed.). Toronto, ON: University of Toronto, Faculty of Education, Guidance Centre.

Holland, J. L. (1985). Making vocational choices: A theory of vocational personalities and the work environments. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L., & Holland, J. E. (1977). Vocational indecision: More evidence and speculation. Journal of Counseling Psychology, 24(5), 404-414.

Hot-100: A quick guide to federal programs and services for

- youth. (1990). Ottawa: Minister of Supply and Services Canada.
- Jarvis, P. S. (1988). CHOICES professional manual. Ottawa: CSG Careerware.
- Johnston, J. A., Buescher, K. L., & Heppner, M. J. (1988). Computerized career information and guidance systems: Caveat emptor. Journal of Counseling and Development, 67, 39-41.
- Jordaan, J. P. (1963). Exploratory behavior: The formation of self and occupational concepts. In D. E. Super, R. Starishevsky, N. Matlin, & J. P. Jordaan (Eds.), Career development: Self-concept theory (pp. 42-78). New York: College Entrance Examination Board.
- Kapes, J. T., Borman, C. A., & Frazier, N. (1989). An evaluation of the SIGI and DISCOVER microcomputer-based career guidance systems. Measurement and Evaluation in Counseling and Development, 22(3), 126-136.
- Katz, M. (1974). System of interactive guidance and information (SIGI) [Computer program]. Princeton, NJ: Educational Testing Service.
- Knefelkamp, L. L. & Slepitz, R. (1976). A cognitive-developmental model of career development - an adaptation of the Perry scheme. The Counseling Psychologist, 6(3), 53-58.
- Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ:

Prentice-Hall.

- Krieschok, T. S. (1987, August). Assessment of adolescent career interests and values. Paper presented at 95th Annual Convention of the American Psychological Association, New York. (ERIC Document Reproduction Service No. ED 291 049)
- Krumboltz, J. D. (1979). A social learning theory of career decision making. In A. M. Mitchell, G. B. Jones, & J. D. Krumboltz (Eds.), Social learning and career decision making. Cranston, RI: Carroll Press.
- Krumboltz, J. D. (1985). Presuppositions underlying computer use in career counseling. Journal of Career Development, 12(2), 165-170.
- Kuder, F. (1976). Kuder form dd occupational interest survey. Chicago: Science Research Associates.
- Maslow, A. H. (1954). Motivation and personality. New York: Harper & Row.
- Mauer, E. B., & Gysbers, N. C. (1990). Identifying career concerns of entering university freshmen using my vocational situation. The Career Development Quarterly, 39(2), 155-165.
- McKee, L. M., & Levinson, E. M. (1990). A review of the computerized version of the self-directed search. The Career Development Quarterly, 38(4), 325-333.
- Miller, M. J., & Springer, T. P. (1986). Perceived satisfaction of a computerized vocational counseling

- system as a function of monetary investment. Journal of College Student Personnel, 27, 142-146.
- Mitchell, L. K., & Krumboltz, J. D. (1984). Social learning approach to career decision making: Krumboltz's theory. In D. Brown & L. Brooks (Eds.), Career choice and development: Applying contemporary theories to practice (pp. 235-280). San Francisco: Jossey-Bass.
- O'Hara, R. P., & Tiedeman, D. V. (1959). Vocational self-concept in adolescence. Journal of Counseling Psychology, 6, 292-301.
- Oliver, L. W., & Spokane, A. R. (1988). Career-intervention outcome: What contributes to client gain? Journal of Counseling Psychologist, 35(4), 447-462.
- Oppenheimer, B. T., & Flum, H. (1986). Teachers' attitudes toward career education. The Career Development Quarterly, 35(1), 34-46.
- Osipow, S. H. (1968). Theories of career development. New York: Appleton-Century-Crofts, Division of Meredith Corporation.
- Osipow, S. H. (1983). Theories of career development (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Osipow, S. H. (1990). Convergence in theories of career choice and development: Review and prospect. Journal of Vocational Behavior, 36, 122-131.
- Osipow, S. H., Walsh, W. B., & Tosi, D. J. (1980). A survey

- of counseling methods. Homewood, IL: The Dorsey Press.
- Parsons, F. (1909). Choosing a vocation. Boston, MA: Houghton Mifflin.
- Perry, W., Jr. (1970). Intellectual and ethical development in the college years. New York: Holt, Rinehart, & Winston.
- Phillips, S. D., & Pazienza, N. J. (1988). History and theory of the assessment of career development and decision making. In W. B. Walsh & S. H. Osipow (Eds.), Career decision making (pp. 1-31). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Phillips, S. D., & Strohmer, D. C. (1983). Vocationally mature coping strategies and progress in the decision-making process: A canonical analysis. Journal of Counseling Psychology, 30(3), 395-402.
- Pickering, J. W., & Vacc, N. A. (1984). Effectiveness of career development interventions for college students: A review of published research. The Vocational Guidance Quarterly, 32(3), 149-159.
- Pietrofesa, J. J., & Splete, H. (1975). Career development: Theory & research. New York: Grune & Stratton.
- Pinder, F. A., & Fitzgerald, P. W. (1984). The effectiveness of a computerized guidance system in promoting career decision making. Journal of Vocational Behavior, 24, 123-131.
- Pinkney, J. W. (1985). Review of the career development

- inventory. In J. V. Mitchell, Jr. (Ed.), Ninth mental measurements yearbook (pp. 271-273). Lincoln, NB: Buros Institute of Mental Measurements.
- Rayman, J. R., & Bowlsbey, J. H. (1977). DISCOVER: A model for a systematic career guidance program. Vocational Guidance Quarterly, 26, 3-12.
- Rayman, J. R., Bryson, D. L., & Bowlsbey, J. H. (1978). The field trial of DISCOVER: A new computerized interactive guidance system. The Vocational Guidance Quarterly, 27, 230-238.
- Reardon, R. (1984). Using information in career counseling. In H. Buck & R. Reardon (Eds.), Career development interventions (pp. 53-60). Springfield, IL: Charles C. Thomas.
- Roe, A. (1956). The psychology of occupations. New York: John Wiley & Sons.
- Roe, A., & Lunneborg, P. W. (1984). Personality development and career choice. In D. Brown & L. Brooks (Eds.), Career choice and development: Applying contemporary theories to practice (pp. 31-60). San Francisco: Jossey-Bass.
- Roselle, B. E., & Hummel, T. J. (1988). Intellectual development and interaction effectiveness with DISCOVER. The Career Development Quarterly, 36(3), 241-250.
- Sampson, J. P., Jr. (1990). Computer-assisted testing and the goals of counseling psychology. The Counseling Psychologist, 18(2), 227-239.

- Sampson, J. P., Jr., & Pyle, K. R. (1983). Ethical issues involved with the use of computer assisted counseling, testing, and guidance systems. Personnel and Guidance Journal, 61, 283-287.
- Sampson, J. P., Jr., Shahnasarian, M., & Reardon, R. C. (1987). Computer-assisted career guidance: A national perspective on the use of DISCOVER and SIGI. Journal of Counseling and Development, 65, 416-419.
- Sampson, J. P., Jr., & Stripling, R. O. (1979). Strategies for counselor interventions with a computer-assisted career guidance system. The Vocational Guidance Quarterly, 27, 230-238.
- Savickas, M. L. (1989). Annual review: Practice and research in career counseling and development, 1988. The Career Development Quarterly, 38(2), 100-134.
- Shertzer, B. (1977). Career planning: Freedom to choose. Boston, MA: Houghton Mifflin.
- Slaney, R. B. (1988). The assessment of career decision making. In W. B. Walsh & S. H. Osipow (Eds.), Career decision making (pp. 33-76). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Spokane, A. R., & Hawks, B. K. (1990). Annual review: Practice and research in career counseling and development, 1989. The Career Development Quarterly, 39(2), 98-128.
- Spokane, A. R., & Oliver, L. W. (1983). The outcomes of

- vocational intervention. In S. H. Osipow & W. B. Walsh (Eds.), Handbook of vocational psychology: Vol. 2. Applications (pp. 99-136). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Stumpf, S. A., Colarelli, S. M., & Hartman, K. (1983). Development of the career exploration survey (CES). Journal of Vocational Behavior, 22, 191-226.
- Super, D. E. (1957). The psychology of careers: An introduction to vocational development. New York: Harper & Row.
- Super, D. E. (1963). Self concepts in vocational development. In D. E. Super, R. Starishevsky, N. Matlin, & J. P. Jordaan (Eds.), Career development: Self-concept theory (pp. 1-16). New York: College Entrance Examination Board.
- Super, D. E. (1980). A life-span, life-space approach to career development. Journal of Vocational Behavior, 16, 282-298.
- Super, D. E., Starishevsky, R., Matlin, N., & Jordaan, J. P. (1963). Career development: Self-concept theory. New York: College Entrance Examination Board.
- Super, D. E., Thompson, A. S., Lindeman, R.H., Jordaan, J. P., & Myers, R. A. (1979). Career development inventory (school form). Palo Alto, CA: Consulting Psychologists Press.
- Super, D. E., Thompson, A. S., Lindeman, R. H., Jordaan, J.

- P., & Myers, R. A. (1981). Career development inventory (college and university form). Palo Alto, CA: Consulting Psychologists Press.
- Thompson, A. S., Lindeman, R. H., Super, D. E., Jordaan, J. P., & Myers, R. A. (1981). Career development inventory: Vol. 1: User's manual. Palo Alto, CA: Consulting Psychologists Press.
- Thompson, A. S., Lindeman, R. H., Super, D. E., Jordaan, J. P., & Myers, R. A. (1982). Career development inventory (college and university form): Supplement to user's manual. Palo Alto, CA: Consulting Psychologists Press.
- Tiedeman, D. V., & Miller-Tiedeman, A. (1984). Career decision making: An individualistic perspective. In D. Brown & L. Brooks (Eds.), Career choice and development (pp. 281-310). San Francisco: Jossey-Bass.
- Tiedeman, D. V., & O'Hara, R. P. (1963). Career development: Choice and adjustment. New York: College Entrance Examination Board.
- Weinrach, S. G. (1984). Determinants of vocational choice: Holland's theory. In D. Brown & L. Brooks (Eds.), Career choice and development (pp. 61-93). San Francisco: Jossey-Bass.
- Zachary, R. A., & Pope, K. S. (1984). Legal and ethical issues in the clinical use of computerized testing. In M. D. Schwartz (Ed.), Using computers in clinical practice: Psychotherapy and mental health applications (pp. 151-

164). New York: Haworth.

Zaccaria, Joseph. S. (1970). Theories of occupational choice and vocational development. Guidance Monograph Series (Series IV: Career Information and Development).

Appendix A

CAREER PLANNING RESEARCH STUDY

I am inviting interested Brock students to participate in a career planning research study conducted in the Counselling Centre at Brock University.

For my thesis in the Master of Education Program at Brock University, I am planning to evaluate the effectiveness of our computer program, PERSONAL CAREER DIRECTIONS (PC DIRECTIONS) in promoting career planning for university students.

The information obtained from participants in the study will be used as group data and your anonymity will be maintained. The regular \$3.00 fee charged for utilizing PC DIRECTIONS will be waived for those students who participate in the study. You are free to withdraw from the study at any time with no consequences or penalties.

The research procedures will involve appointments to be set up at your convenience. All participants in the study will be asked to complete the following tasks:

- A checklist of background information (15 minutes),
- An assessment of career planning (30 minutes),
- A re-assessment of career planning (30 minutes).

All of the participants will complete the User Information Outline for PC DIRECTIONS (30 minutes) and interact with the computer program (30 minutes) as part of the study. All time commitments in brackets are approximate. In addition, you will be asked to respond to a few informal questions upon completion of the program.

If you are interested in becoming familiar with our computer program for exploring career options, please sign the consent form below and submit it to a Career Assistant in the Counselling Centre, ST411.

Thank you for your participation.

Sincerely,
Janet Pollock

CONSENT FORM

I have read the above information and agree to participate in the career planning research study. I give my consent for information obtained from the study to be used as group data.

Date _____ Signature _____

Phone # _____

Appendix B



PERSONAL CAREER DIRECTIONS
Copyright © 1983
Software Research Corporation
Revised, April 1986

"Used with permission, not to be copied"

A. INTEREST FACTORS

1. Working with things, numbers or objects
2. Dealing with people as clients, customers or associates
3. Routine, concrete and organized work
4. Working to improve social conditions
5. Directing, planning or organizing activities
6. Studying or communicating ideas or information about people or animals
7. Work that requires a scientific, technical or analytic approach to facts
8. Doing abstract or creative work
9. Working with machines, processes or techniques
- A. Doing work in which you can see clear results

A. Interests

- ☐ Doesn't matter to me.
or
I Like (L) _____/_____/_____
I Dislike (D) _____/_____/_____

D. EDUCATION LEVEL

1. Grade 8
2. Grade 10
3. Grade 12/13
4. 1-2 years community college, vocational/technical/trade school
5. Complete undergraduate degree
6. Professional or graduate degree

D. Education Level

I expect to complete: _____
or
I have completed: _____

E. ENVIRONMENTAL CONDITIONS

1. Extremes of cold, plus temperature changes
2. Extremes of heat, plus temperature changes
3. Damp and/or wet
4. Noise and/or vibration
5. Risk of injury
6. Dust/fumes/odours
7. All of the above

E. Environmental Conditions

☐ Doesn't matter to me.
or
I am not willing to tolerate: _____/_____/_____

B. APTITUDE FACTORS

- G General Learning Ability
V Verbal Aptitude
N Numerical Aptitude
S Spatial Perception
P Form Perception
Q Clerical Perception
K Eye-Hand Coordination
F Finger Dexterity
M Manual Dexterity

APTITUDE LEVELS

1. Top 1/10
2. Top 1/3 but not top 1/10
3. Middle 1/3
4. Bottom 1/3 but not bottom 1/10
5. Bottom 1/10
6. Not sure

B. Aptitudes

- ☐ Not important to me.
or
Factor
enter most appropriate aptitude level
G _____
V _____
N _____
S _____
P _____
Q _____
K _____
F _____
M _____

F. EARNINGS

1. Under \$15,000
2. At least \$15,000
3. At least \$20,000
4. At least \$25,000
5. At least \$30,000
6. At least \$35,000
7. At least \$40,000
8. At least \$45,000
9. At least \$50,000

F. Earnings

☐ I will take what the job offers me.
or
I expect to make: _____

G. HOURS OF WORK/ TRAVEL

1. Rotating shift work
2. Irregular/non-standard hours
3. Working weekends
4. Overtime
5. Seasonal employment
6. Travel
7. All of the above

G. Hours of Work/ Travel

☐ Doesn't matter to me.
or
I am not willing to tolerate: _____/_____/_____

C. TEMPERAMENT FACTORS

1. Performing many duties that change often
2. Repeating the same set of tasks
3. Following the instructions of others
4. Working independently
5. Gaining co-operation
6. Influencing opinions
7. Performing under stress
8. Making decisions based on personal knowledge
9. Making decisions based on concrete evidence
- A. Expressing your personality in your work
- B. Meeting strict standards

C. Temperaments

- ☐ Doesn't matter to me.
or
I Like (L) _____/_____/_____
I Dislike (D) _____/_____/_____

H. PHYSICAL DEMANDS

1. Sedentary (lifting or moving up to 10 lbs/5 kg)
2. Light (lifting or moving 10-25 lbs/5-11 kg)
3. Medium (lifting or moving 25-50 lbs/11-23 kg)
4. Heavy (lifting or moving 50-100 lbs/23-45 kg)
5. Very heavy (lifting or moving more than 100 lbs/45 kg)

H. Physical Demands

☐ Doesn't matter to me.
or
No more than: _____

Appendix C

"Used with permission, not to be copied"

GENERAL OCCUPATIONS LIST JOBS SO FAR

Number of occupations: 11

1135114:Bank Manager	1135122:Credit Manager
1137118:Sales Manager	1171182:Securities Counsellor
1171186:Bursar	1171190:Trust Officer
1176114:Insurance Inspector	1179190:Contracts Administrator
1179198:Property Manager	2791114:Vocational Arts Teacher
2791118:Vocational Business Teacher	

INT:125-7-9 APT:111111111 TEMP:-2-3468 EDUC:6 ENV:-4-6
HOURS:-1-2 PHYDEM:3

<Press any key>

DESCRIPTIONS

CCDO #: 1143114

Production Manager

Plans and controls activities of a production department. Assesses production requirements. Makes time and cost estimates, schedules. Establishes maintenance schedules. Devises inspection programmes.

INTERESTS:

1. Working with things, numbers or objects
2. Dealing with people as clients, customers or associates
5. Directing, planning or organizing activities
6. Studying or communicating ideas or information about people or animals
7. Work that requires a scientific, technical or analytic approach to facts

<Press any key>

DESCRIPTIONS

CCDO #: 1143114

Production Manager

APTITUDES:

G. General Learning Ability	level: 1- Top 1/10
V. Verbal Aptitude	level: 1- Top 1/10
N. Numerical Aptitude	level: 2- Top 1/3 but not top 1/10
S. Spatial Perception	level: 3- Middle 1/3
P. Form Perception	level: 3- Middle 1/3
Q. Clerical Perception	level: 4- Bottom 1/3 but not bottom 1/10
K. Eye-Hand Co-ordination	level: 4- Bottom 1/3 but not bottom 1/10
F. Finger Dexterity	level: 4- Bottom 1/3 but not bottom 1/10
M. Manual Dexterity	level: 4- Bottom 1/3 but not bottom 1/10

TEMPERAMENTS:

1. Performing many duties that change often
4. Working independently
5. Gaining co-operation
6. Influencing opinions
8. Making decisions based on personal knowledge
9. Making decisions based on concrete evidence

<Press any key>

DESCRIPTIONS

CCDO #: 1143114
Production Manager

EDUCATION LEVEL:
5. Complete undergraduate degree

ENVIRONMENTAL CONDITIONS:
(No special conditions)

FUTURE OUTLOOK:
2. Stable

EARNINGS:
7. At least \$40,000

HOURS OF WORK/TRAVEL:
4. Overtime

PHYSICAL DEMANDS:
1. Sedentary (lifting or moving up to 5 kg/11 lbs)

<Press any key>

DESCRIPTIONS

CCDO #: 1143114
Production Manager

PHYSICAL ACTIVITIES:
9. Speaking
A. Listening
B. Seeing

INSIDE / OUTSIDE:
1. Inside

TRAINING REQUIREMENTS:
6. Over 4 years

<Press any key>

Appendix D

CAREER PLANNING RESEARCH STUDY

BACKGROUND INFORMATION

A. Please check the appropriate response:

1. Gender: Female _____
 Male _____
2. Age: under 20 _____
 20-24 _____
 25-29 _____
 30-34 _____
 35-39 _____
 40 + _____
3. Full-time studies _____
 Part-time studies _____
4. Number of course completed:
 0-5 _____
 6-10 _____
 11-15 _____
 16-20 _____
 20 + _____
 Grad _____
5. Previous career planning assistance:
 I. Brock Career Counselling Service
 (a) Career assistant services _____
 (b) Completed self assessment _____
 (c) Completed occupational research _____
 (d) Completed job search process _____
- II. High School career assistance _____
- III. Other career assessment _____

B. Please complete the following:

1. Major area of study: _____
2. Please list any job titles that you are considering for future careers:
- _____
- _____
- _____
- _____
- _____
- _____

Appendix E

FOLLOW-UP QUESTIONS FOR PC DIRECTIONS

1. How do you feel about the program?
2. How helpful was the program to you?
3. How do you feel about the results?
4. Do the results seem realistic?
5. Do the results surprise you?
Why?

Additional Comments